

MOTOR AGE

A CHILTON PUBLICATION

DEVOTED TO THE INTERESTS OF THE INDEPENDENT SERVICE STATION



Design for grand staircase at 40th Anniversary National Automobile Show—Against a Greek temple background, a heroic size phantom high-priestess casts her spell, it appears upon the twenty-foot figure of a modern mechanic and commands him to produce the "miracle car" of today.

OCTOBER
1939

TOUGH*

But oh So Gentle!



*
Tough
ON OIL-PUMPING

Gentle
ON CYLINDER WALLS

● Use Steel-Vent with confidence under any motor condition. Performance has made Steel-Vent the largest selling oil ring in the country—and its popularity continues to grow, by leaps and bounds. It's the right ring for any job, from rebores to .025 tapers.

HASTINGS MANUFACTURING COMPANY
HASTINGS, MICHIGAN

Piston Rings • Piston Expanders • Valv-Rings

ANOTHER REASON why Steel-Vents check the rate of cylinder wear—Steel-Vent's low pressure at top of travel leaves film of oil on cylinder wall for proper lubrication.

→ HASTINGS →

STEEL-VENT PISTON RINGS

U. S. Patent No. 2,748,997

Stop Oil-Pumping • Check Cylinder Wear

your anti-freeze profits when you IN GREATEST DEMAND!

**"ZERONE" SALES WENT
UP AGAIN LAST WINTER**

1 ARE WINTERS GETTING Milder?

For the past 3 years, average winter temperatures have been slightly above normal. But it is not *average* temperature that makes anti-freeze business. It is the number and severity of cold snaps. We've had plenty of them . . . and will again this year. During these past three so-called "warm" winters, "Zerone" sales have increased each year!



2 REMEMBER LAST YEAR?

A mild autumn saw dealers delaying purchase of anti-freeze . . . or laying in small stocks. Then a sudden and severe cold snap around Thanksgiving hit most of the country. Countless dealers ran out of "Zerone" . . . had to turn away customers by the score. Jobbers were flooded with orders . . . couldn't make deliveries to everybody at once. Were you one of the dealers who lost out?

EARLY SERVICING

Early stocking is the answer. Most of your anti-freeze business is done in the first three freezing days. Get ready for this rush of business. Have an ample supply of "Zerone" now. But sell early protection. You don't have to wait till it gets cold before you can sell "Zerone"! We're backing you up with special early season advertising. Remember, do your customers a favor when you sell them early protection!



2 NEW ITEMS THAT WILL SPEED UP YOUR WINTER WORK

The New IMPERIAL UNIVERSAL FREEZETESTER

The General

"Commander of All Anti-Freezes"

Tests 50 different anti-freeze solutions without the use of a wall chart.

MEN in every type of automotive service work where radiators must be checked for winter driving are extremely enthusiastic about "The General" and other testers in the new Imperial Freezetesters line. They like the idea of being able to test the many different anti-freezes now in common use without having to run to a wall chart . . . they like the carrier with its big, easy-to-read correction tables . . . they like the way color bands are used to simplify correction for temperature . . . the way breakage is prevented . . . the way cleaning is simplified.

Get set to handle your anti-freeze testing rapidly and accurately with "The General".



No. 525-T Universal Freezetesters and Carrier, "The General," List \$5.00. Dealer Net \$3.00.

Individual Freezetesters, List \$2.75. Dealer Net \$1.65.

● Easy-to-read correction tables for more than 50 anti-freezes are right on this carrier.



● Bulletin No. 303 will give you complete details about these remarkable new Imperial Freezetesters.

The New IMPERIAL SEL'-BAT-TEST

THE way orders are pouring in for the sensational new Imperial Sel'-Bat-Test battery tester, shows how well service and repair men like this new tester. This is a thermal correcting battery tester that helps the dealer get more business because it shows his customer what needs to be done—not in terms of specific gravity, but in plain printed words, right on the instrument. It not only helps the dealer get more charging and repair business but it builds up battery sales.

Order one of these accurate, easy-to-read, Imperial battery testers today.

Imperial No. 500-T Sel'-Bat-Test Battery Tester. List, \$1.75. Dealer Net, \$1.05.



● Complete information on the new Sel'-Bat-Test and other Imperial Battery testers is presented in Bulletin 302. Write for your copy.

THE IMPERIAL BRASS MFG. CO., 1217 W. Harrison St., Chicago

IMPERIAL Automotive Products

TUBE FITTINGS • FLEXIBLE TUBING • TUBING SERVICE TOOLS
BATTERY TESTERS • FREEZETESTERS • WELDING OUTFITS AND SUPPLIES

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DEVOTED TO THE INTERESTS OF THE INDEPENDENT SERVICE STATION

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JULIAN CHASE, Directing Editor
W. K. TOBOLDT, Editor

J. BIRCH POLLOCK, Managing Editor ROBERT HANKINSON, Technical Editor
HOWARD KOHLBRENNER, Art Editor B. M. IKERT, Chicago Technical Editor
J. A. LAANSMA, Merchandising Editor JOS. GESCHELIN, Detroit Technical Editor
MARCUS AINSWORTH, Specifications Editor

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MOTOR AGE

OCTOBER 1939

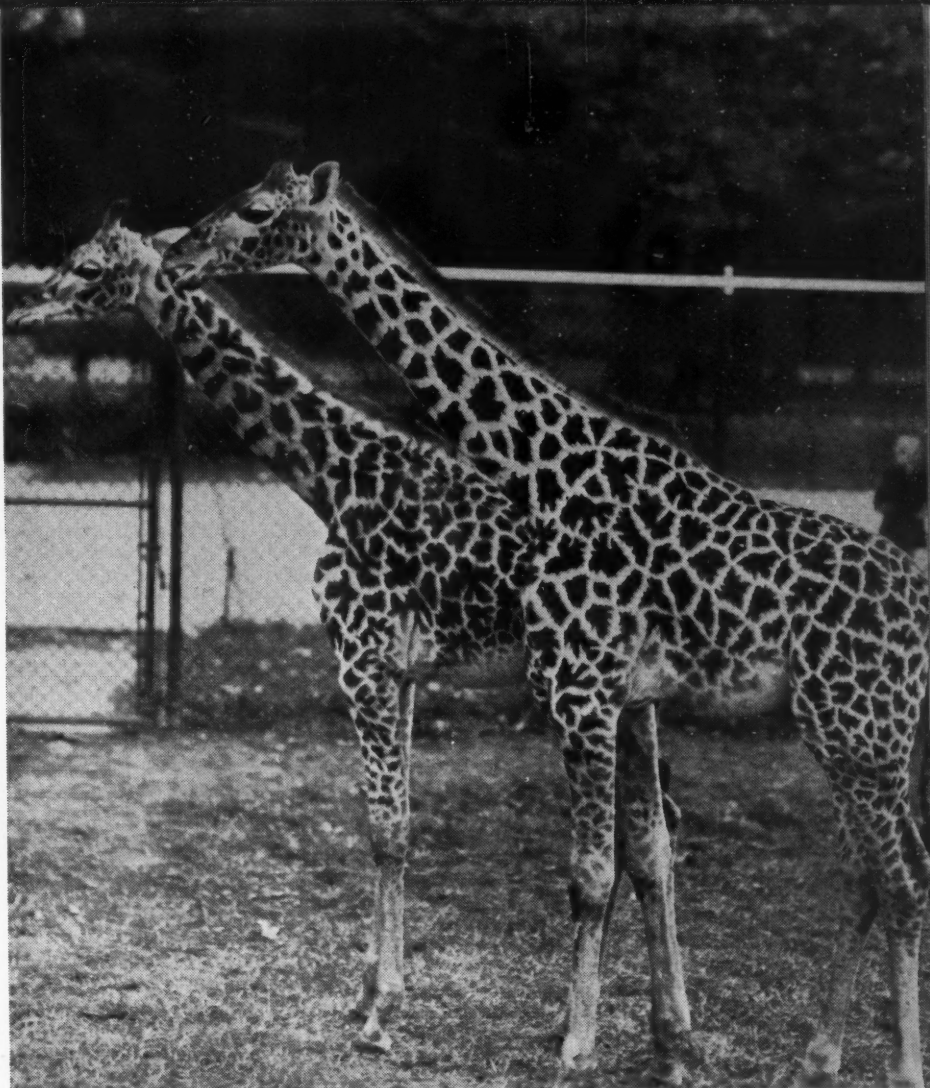
Neck Sticker-Outer

I certainly stuck my neck out when I asked youse guys for a bunch of slang, and promised each one a copy of our tune up manual. When the final count of the letters was made, the boss didn't know whether to be sore at the cost of sending out all of those manuals or pleased at the reader interest which was shown. However, I did get a fine bunch of material which should form the basis for an interesting page, and I want to particularly thank Herscel Thomas of Long Beach, Cal.; Lou Ellis of San Francisco, Cal.; Joe Quigley of New York; Cliff Oppel of Duluth, Minn.; D. M. Williams of Cleveland, Ohio; Ted Crosby of Allston, Mass.; and C. L. Kaston of Milwaukee, Wis., who sent in particularly long lists.

P. S. and the Service Man

A national consumer magazine with more than two and three-quarter millions of family readers has started something that each independent service operator can turn to his own advantage in a big way—if he will. *Collier's*, after thoughtful study and careful preparation, has inaugurated a large-scale "Preventive Service" campaign addressed to the owners and users of more than two billion dollars' worth of automobiles. The campaign is planned to run for at least a year and will urge upon car owners the importance to them of keeping their cars in the best of good order for all conditions of driving at all times of the year.

This nation-wide activity will reach directly the owners and operators of cars which the service man, in the natural order of things,



SHOP TALK

by **BILL TOBOLDT**

is sooner or later asked to fix up and put right. It will furnish the push on one side of the service man's customers, while he, if he is alert to the opportunity, provides the pull on the other side. If any service man does not get his full share of the extra business that could be, and should be, developed by such coordinated effort, it will be his fault alone.

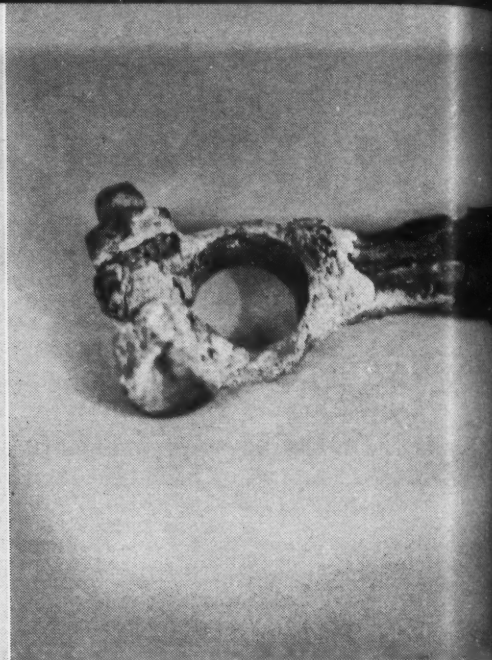
Collier's, in one issue a month throughout the campaign, will publish a large and striking advertisement, read by the man behind the wheel, which will feature the value to him of "Preventive Service" and urge him to do something about it right away for his own sake—for

the advantages that he himself can derive from it in economy, comfort, convenience and safety. Supplementing these advertisements, repair shops will be furnished with display cards, window streamers, and folders to be mailed to prospects, the last at a very normal cost. Meetings will be held in many localities, under the sponsorship of the campaign managers, to discuss ways and means of coordinating effort all along the line, from the manufacturers of service equipment, parts and such things, through wholesalers to service men who provide the points of contact with, and sales to, car owners.

(Continued on page 37)

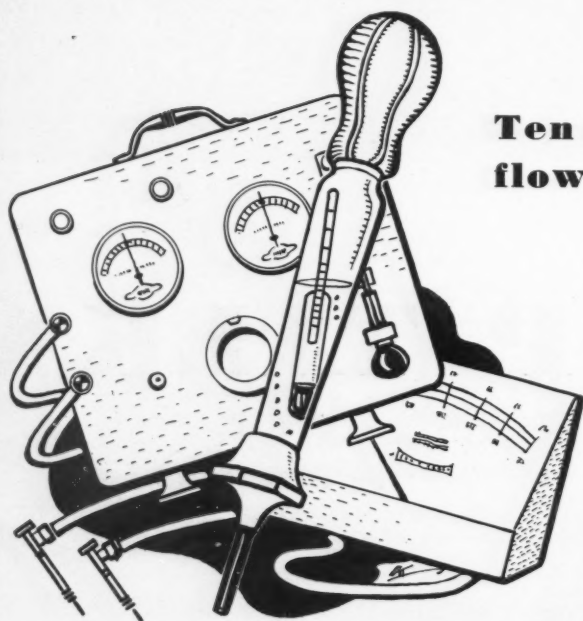


1—Clean corrosion from all parts around battery box and repaint with an acid resisting paint.



2—Effect of corrosion on battery cable terminal. Terminals that show any effect of corrosion should be replaced.

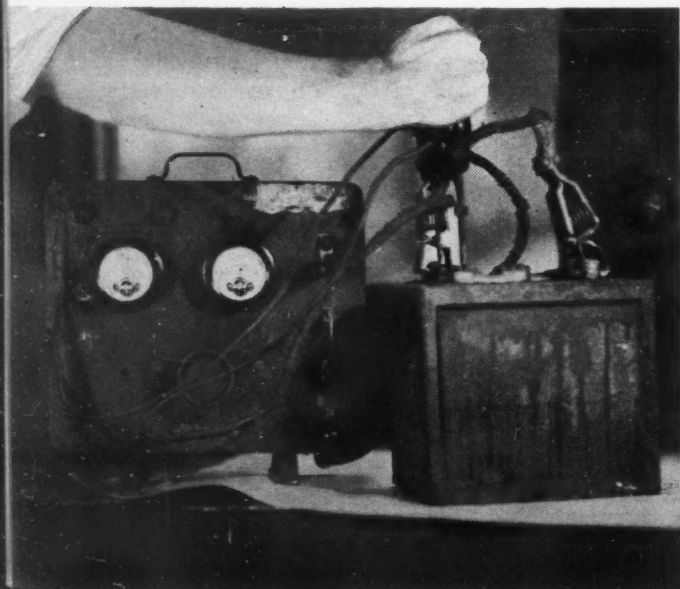
Checking Batteries a



Ten steps to follow in providing a good flow of current for the starting motor

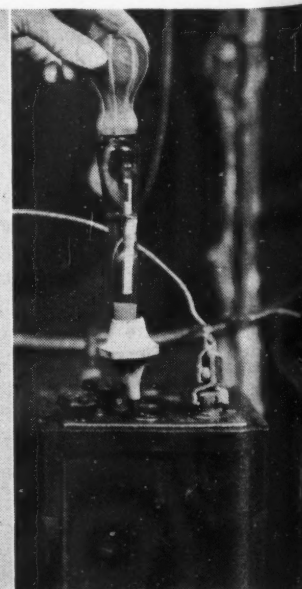
by **BOB TURNER**

Note: There are many different makes and types of instruments available for checking batteries and wiring. Those shown in the illustrations were selected only to show the method of making the particular test, and not because they had any advantage over any other type or make of instrument.



7—Test condition of each cell of the battery under load. This may be done by using a test instrument made for the purpose or by letting the battery crank the engine while a voltage reading is taken at each cell.

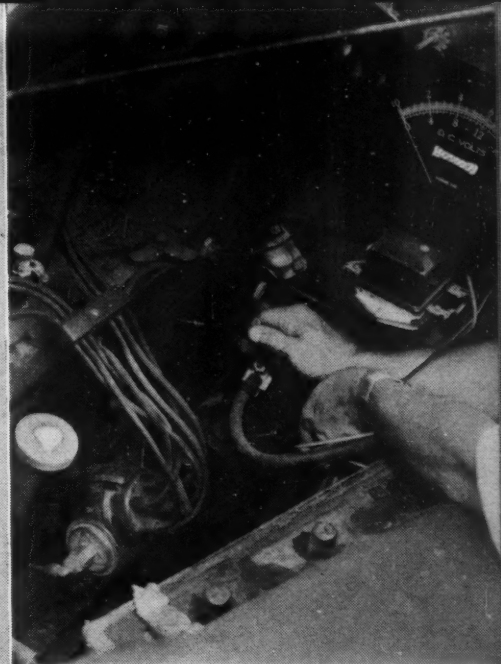
8—The amount of charge in the battery may be determined by taking a specific gravity reading of the electrolyte in each cell with a hydrometer. A fully charged battery will register not less than 1250.





3—Check voltage drop at the battery cables. This may be done with the battery cranking the engine and holding one test prong of the voltmeter on the battery terminal and the other test prong of the voltmeter on the cable binding post. Do this at both the starting motor cable and the ground strap. If the voltage drop is more than $2/10$ of a volt, the cause should be remedied.

4—The same check as made in illustration number three should be made from the starting motor frame to ground. In the event the voltage drop at this point exceeds $2/10$ of a volt, the surfaces between the starting motor frame and housing should be thoroughly cleaned.

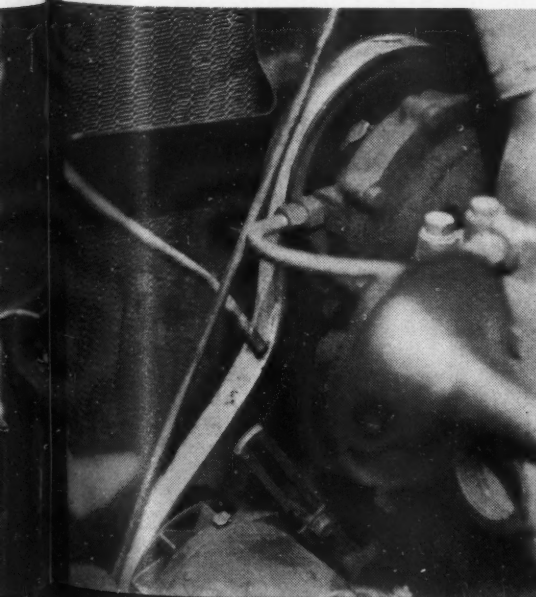
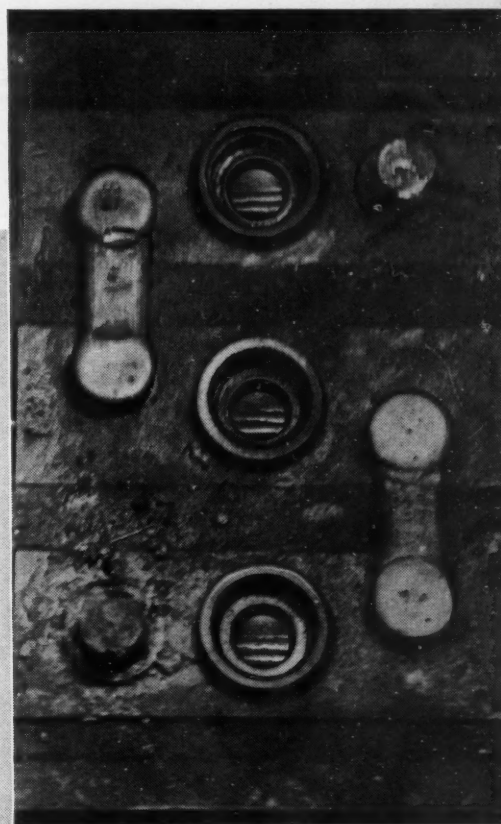


s and Cables



5—Battery hold down bolts should be tightened uniformly so that excessive strains will not cause the condition illustrated.

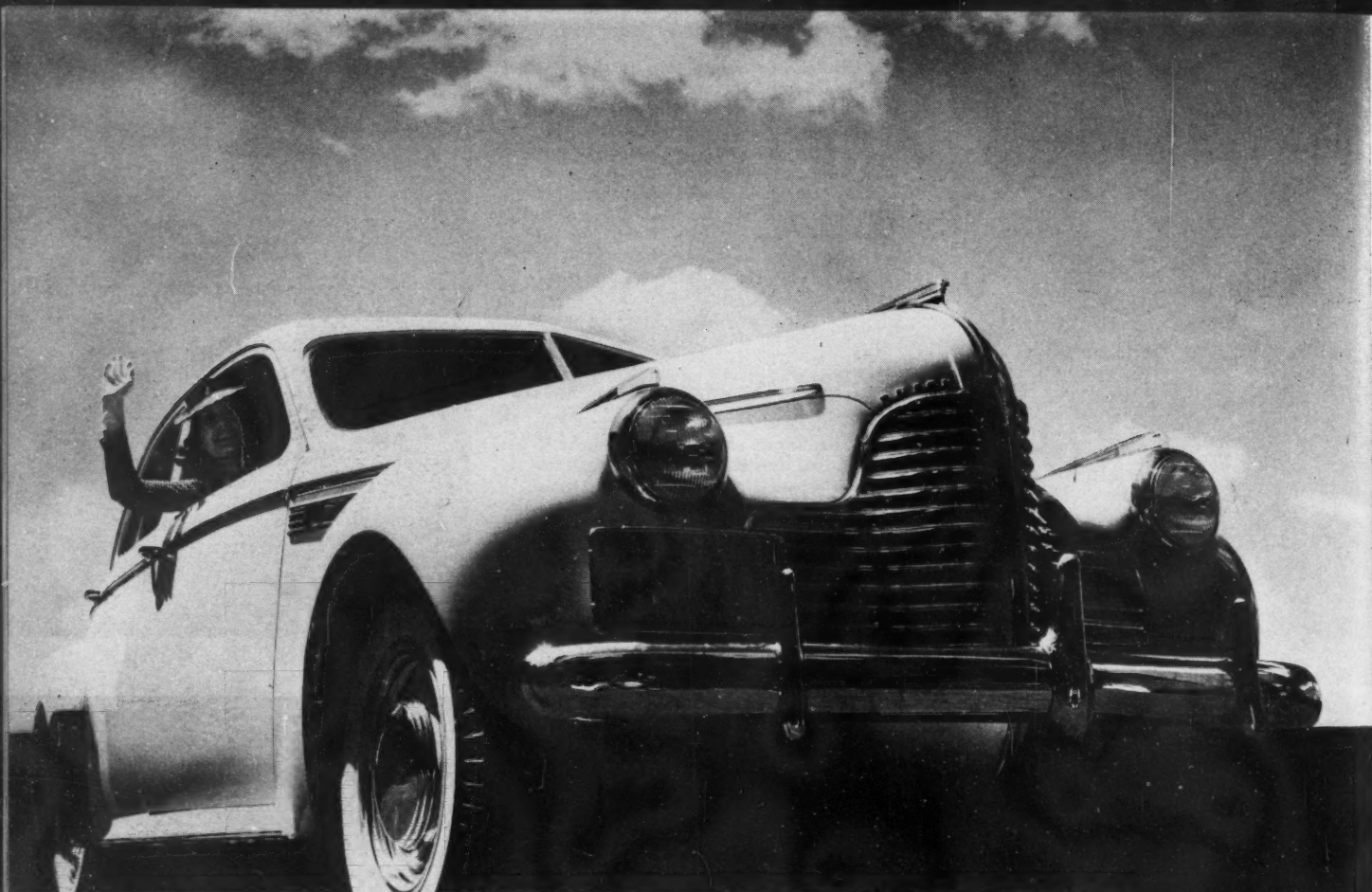
6—Water level should be constantly maintained approximately $3/8$ in. above the top of the plates. Do not overfill as this will cause excessive corrosion.



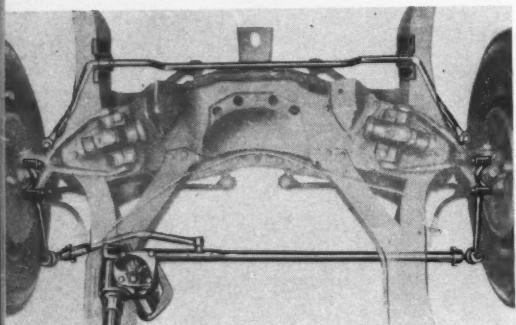
9—Check fan belt for looseness and general condition to make sure there is no slippage on pulleys. Loose or worn fan belt will affect generator charging rate.

10—Check generator charging rate with suitable instruments. Also, test current and voltage regulators so that generator will keep battery in properly charged condition.





BUICK *for* 1940



Improved steering gear. On series 40, 50, 60 and 70 the steering linkage is the direct cross type with the steering gear pitman arm connected directly to the tie rod.

By JOSEPH GESCHELIN

SUPPLEMENTING its well-known series of cars with two new models, Buick offers six different lines of motor cars for 1940, with 22 different bodies.

The complete line comprises—the Series 40 on 121-in. wheelbase, 1 in. longer than last year; new Series 50, on 121-in. wheelbase;

Adds two new models; engine details improved; directional signals now standard

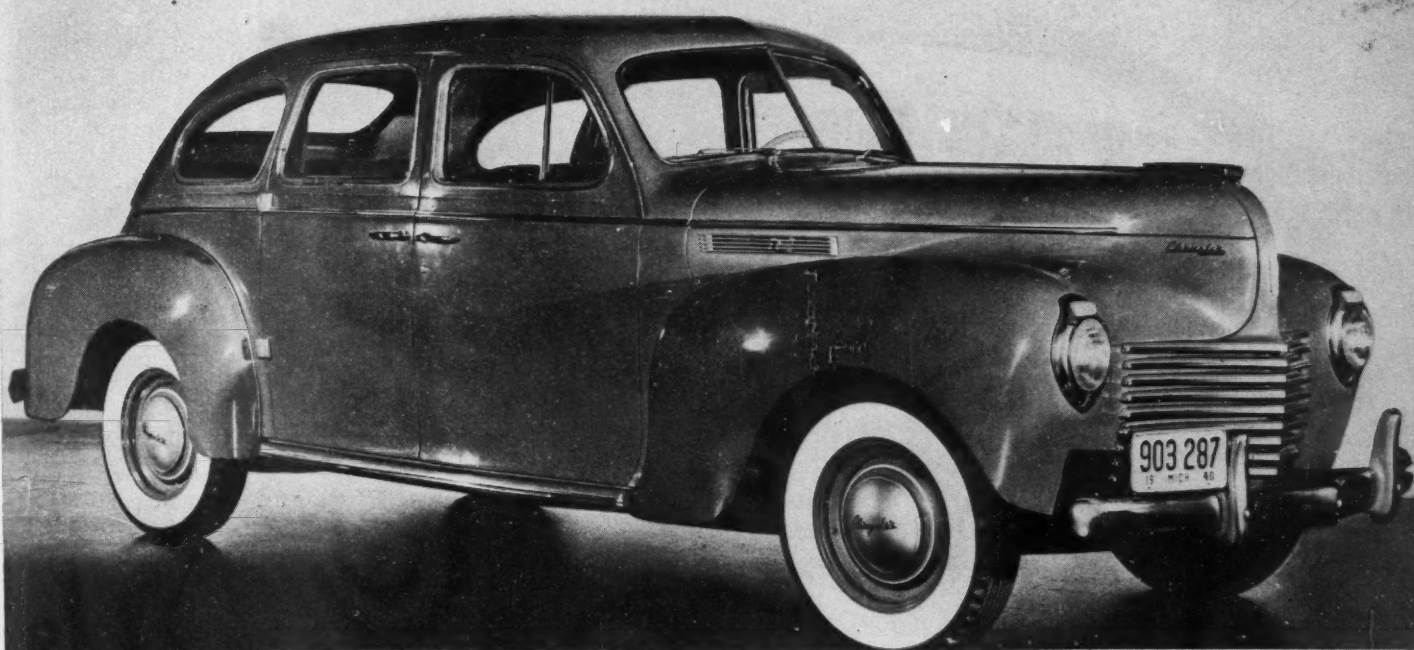
Series 60 on 126-in. wheelbase; new Series 70 on 126-in. wheelbase with same body and styling as the Series 50; Series 80 on 133-in. wheelbase; Series 90 on 140-in. wheelbase.

The two new series—the Super Series 50 and Roadmaster Series 70—feature new “streamlined” style bodies, lower and wider than previous models, supplied without running boards. With the exception of new frames, the new series have chassis units which are similar in type and design to the corresponding standard lines.

Although the engines and major mechanical features remain substantially the same, many detail changes and improvements have been incorporated and new features added. A highspotting of such

activity may be summarized briefly as follows—sealed beam headlamps; directional signal as standard equipment, operating the pairs of parking lamps and stop lights on each side; new frames on 40, 50, 60, 70; one-piece torque tubes with flange mounting at carrier on Series 40, 50, 60 and 70; threaded outer bushings on lower control arms; many engine details improved; new type ignition switch mounted on instrument panel; improved steering column gear shift; longer transverse radius rod and added rear stabilizer on the 40, 50, 60 and 70; adoption of the new AC Klee-Klean oil filter as standard equipment on all models.

In addition Buick boasts a novel
(Continued on page 56)



CHRYSLER *for* 1940

New sheet metal and bodies; improved weight distribution; both axles shifted rearward

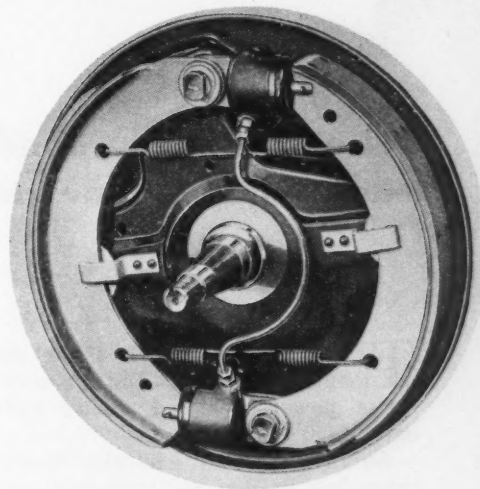
SPARKLING new styling with entirely new sheet metal and bodies coupled with improved weight distribution patterned after the Chrysler Airflows mark the setting for the 1940 Chrysler line. Six models are offered for the coming season—the Royal with six body types; Traveler with four body types; Windsor with seven body types; New Yorker with five body types; Saratoga with one body—the 6-passenger sport formal sedan; and Crown Imperial with three body types.

On Chrysler models the rear axle center has been shifted to rear $7\frac{1}{2}$ in., while the front axle has been moved 4 in. rearward. Wheelbase of the various models in the line has been increased correspondingly

in the 1940 models as follows:

Royal and Windsor— $122\frac{1}{2}$ in., up to $3\frac{1}{2}$ in. over last year, with $139\frac{1}{2}$ in. for 7-passenger models. Traveler, New Yorker and Saratoga models— $128\frac{1}{2}$ in., up $3\frac{1}{2}$ in. over last year. The Crown Imperial has a wheelbase of $145\frac{1}{2}$ in., $1\frac{1}{2}$ in. longer than last year.

These changes have made possible the development of a unique body construction in which the rear doors are full width without the usual cut-out for the wheelhouse. "Sealed Beam" headlamps are standard equipment with parking lights in the top of the headlamp on Royal and Windsor models, individual park-lamps mounted on top of front fenders on the other models. Two-speed electric wind-



Note the two cylinders for the hydraulic brake.

shield wipers with automatic circuit breaker are standard equipment on all models.

Automatic overdrive with "step-down" fatigue at the control of the operator is available on the Windsor, New Yorker, Saratoga and Crown Imperial. Fluid-drive also

(Continued on page 58)



DE SOTO *for* 1940.

Wheelbase lengthened; horsepower boosted; changes in frame design and transmission

THE 1940 DeSoto is a car of longer wheelbase and greater horse power, restyled inside and out.

As in the other Chrysler lines, there has been a redistribution of weight between the front and rear axles, and the wheelbase has been lengthened. The front axle was moved back 4 in. relative to the engine, the rear axle $7\frac{1}{2}$ in., which increased the wheelbase $3\frac{1}{2}$ in., to $122\frac{1}{2}$ in. This shifting of the axles brought the rear seat farther inside the wheelbase and improved its riding qualities. It also made possible the use of "square-bottom" rear doors in which the windows can be lowered all the way to the sill level.

While there have been no changes in the cylinder dimensions of the six-cylinder $3\frac{3}{8}$ -in. by $4\frac{1}{4}$ -in. engine, output has been boosted by an increase in the valve lift.

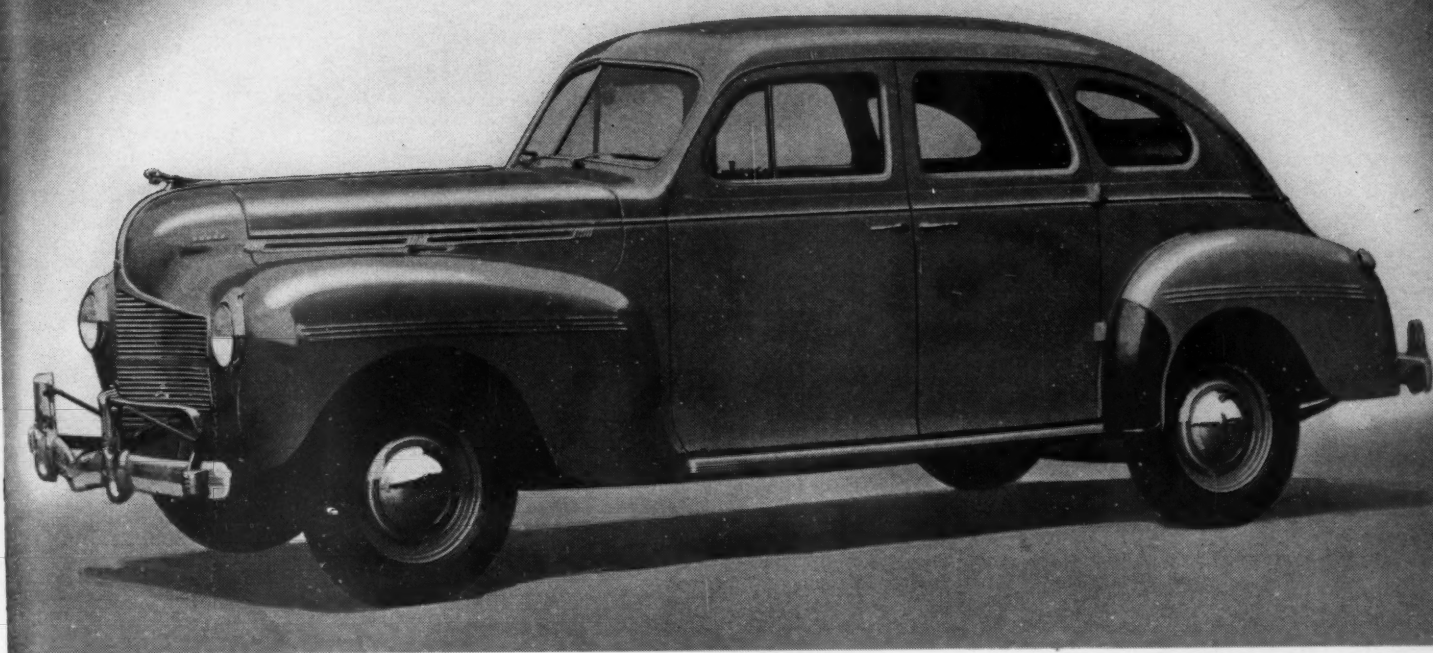
Changes in frame design have resulted in a lower center of gravity for the whole car. The front cross-member is now deeper and stronger, and the angle of the rear kick-up is sharpened. To make the overdrive unit (when used) more accessible, the X member has been moved farther to the rear.

A number of changes have been made in the transmission. Low-speed and reverse gears have a face $\frac{1}{16}$ in. wider; the straight roller bearings on the counter shaft have been made $\frac{3}{16}$ in. longer, and the

range of motion of the shifting member inside the transmission has been increased to ensure full engagement of the cluster and sliding gears. The shifting arm projects from the transmission at the side, which makes possible a level floor in the front compartment and a simpler hook-up. The synchronizer has been improved. Round shift rails in the transmission are said to make for greater accuracy and uniformity, and the chamfering of the teeth of the low-speed and reverse gears has been improved. The actual motion of the column-mounted shift lever is now less than it was formerly.

Superfinish, the special process developed by the Chrysler Corporation, is applied mainly to engine parts such as crankshafts, pistons, flywheels, camshafts, valve stems, and tappet heads, but the wearing surfaces of the brake drums also have it.

A new addition to the line of bodies is a convertible coupe in the custom series, with a top which can be raised or lowered by means of engine power. A push-pull control knob on the instrument panel starts the mechanism.



DODGE *for* 1940

TWO Dodge lines—the Special Dodge with three body styles; and DeLuxe Dodge with seven body styles—featuring entirely new styling, sheet metal, and bodies are offered for 1940. In line with the principle of weight distribution for improved riding comfort, the rear axle is moved $4\frac{1}{2}$ in. to the rear, while the front axle is shifted 2 in. rearward, increasing wheelbase to $119\frac{1}{2}$ in., up $2\frac{1}{2}$ in. from last year. This change made possible an unusual body layout with full width, straight sided rear doors permitting easy entry. The floor now is one inch lower, body roof $25/16$ in. lower. All models are available with or without running boards.

Sealed beam, "package-type" headlamps now are standard equipment, raised one inch higher to provide more light on the road.

Although the basic mechanical units remain practically the same, they incorporate many detail improvements and changes. The frame is new, lower and stiffer with a large front cross member. Front suspension has been improved by providing a stronger mounting for the upper control arm and by

Detail changes in basic mechanical units; transmission and frame are new in design

changing the angularity of control arms. Tie-rod ends are larger and stronger. A new seal is found at the rear axle bearings designed to prevent entry of grease to the wheel bearings.

Engine remains 6-cyl., L-head, $3\frac{1}{4}$ -in. bore x $4\frac{3}{8}$ -in. stroke, 218 cu. in. displacement, rated 87 hp. at 3600 rpm. with cast-iron head and 6.5 to 1 compression ratio. New precision type bearings are used—bronze back with bonded babbitt lining. An edge-type fuel filter is mounted directly at the carburetor. Automatic choke, automatic spark advance with vacuum control, and automatic manifold heat control are continued. Due to the adoption of the new sealed beam headlamps,

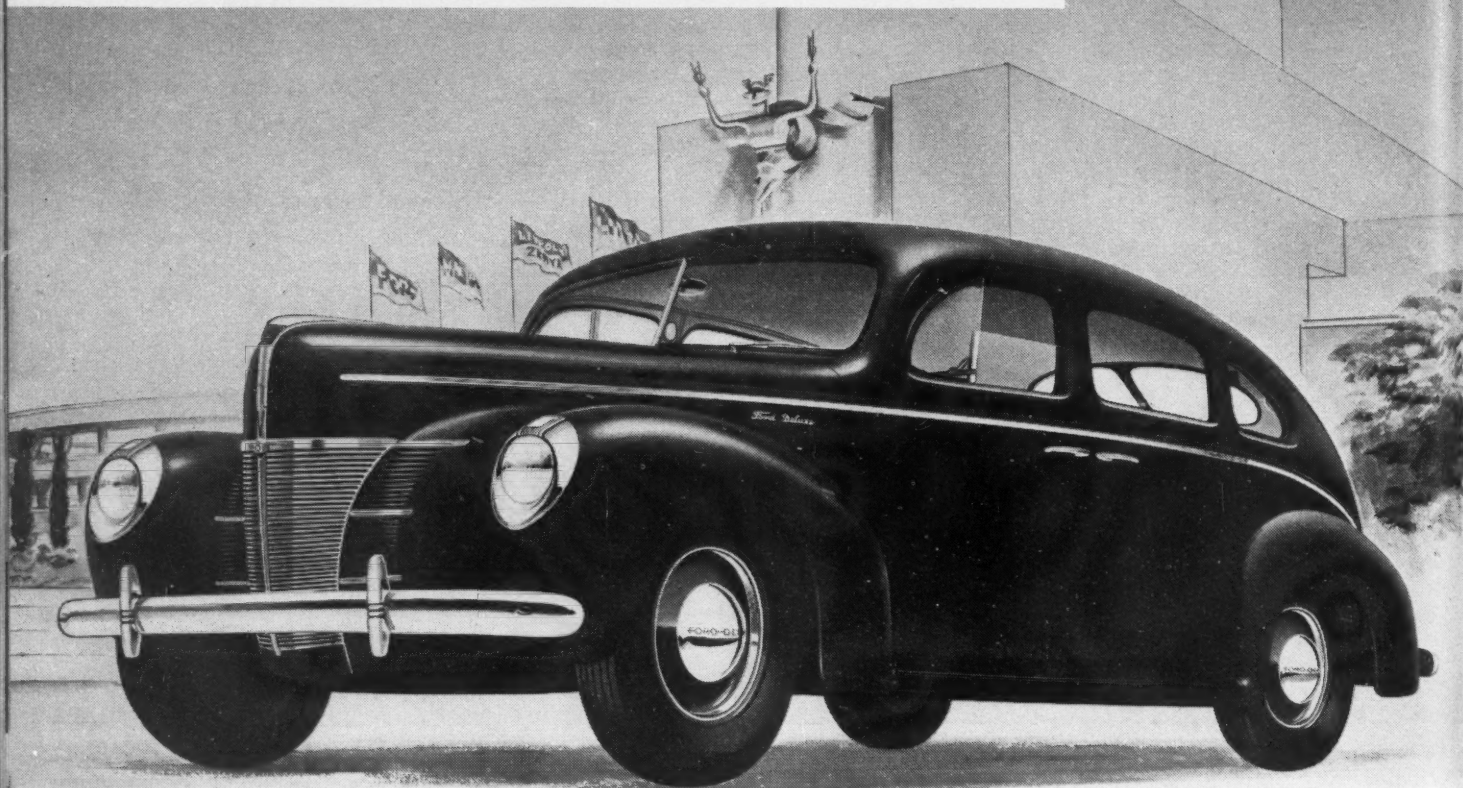
generator capacity has been boosted to 35 amp. with full voltage-current regulation.

The crankshaft is heavier due to the adoption of heavier counterweights which contribute to smoother operation.

The transmission has been redesigned with shifter levers coming out of the side of the housings. Shift controls for cross-over and gear changes are of positive linkage type and are housed within the steering column. A new type of steering column shift lever now is employed. It is a one-piece plastic molded over a steel insert, supplied in color to match the interior trim treatment.

(Continued on page 55)

FORD *for* 1940



Finger-tip gearshift; torsion bar ride stabilizer; improved type brake drums

FINGER-TIP gearshift, better road illumination through the adoption of sealed beam headlights, and improved riding qualities feature the Ford announcement for Ford, Mercury and Lincoln Zephyr cars. Increased room in the driving compartment is provided by the finger-tip gearshift mounted directly below the steering wheel. Another comfort item found on the Ford 85, Ford DeLuxe and Mercury cars is the torsion bar ride stabilizer which helps to control side sway

and enable the car to negotiate rough roads on an even keel. Front and rear springs of the Mercury and DeLuxe cars are now equipped with covers to maintain spring characteristics more constant over varying conditions. In addition, the front spring on the 85, DeLuxe and Mercury cars is longer and more flexible for improved riding qualities. In addition to the new sealed beam headlights, driving fatigue on the Mercury has been reduced through the use of polished plate

safety glass which gives clear vision without distortion.

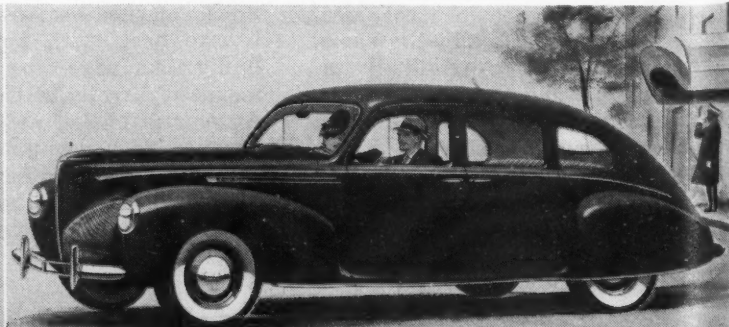
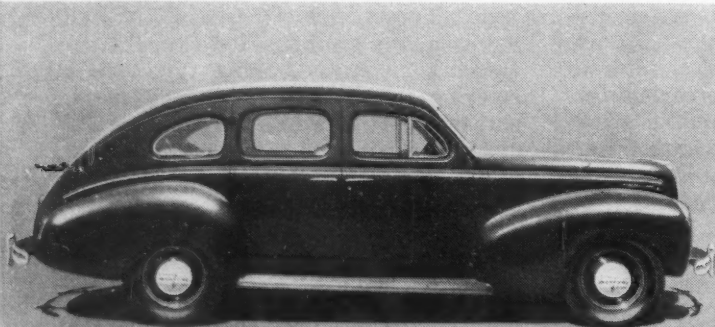
A safety item on the Ford line is the use of improved drums for the hydraulic brakes which contribute to longer life and greater quietness.

Four Ford V-8 and five DeLuxe body types comprise the two Ford lines. A new business coupe as well as a Fordor sedan, Tudor sedan and coupe are available on both. There is also a DeLuxe convertible

(Continued on page 55)

Mercury 8 Town-Sedan for 1940

1940 Lincoln-Zephyr Sedan





NASH *for* 1940

**Independent front suspension as standard;
increased horsepower; new steering system**

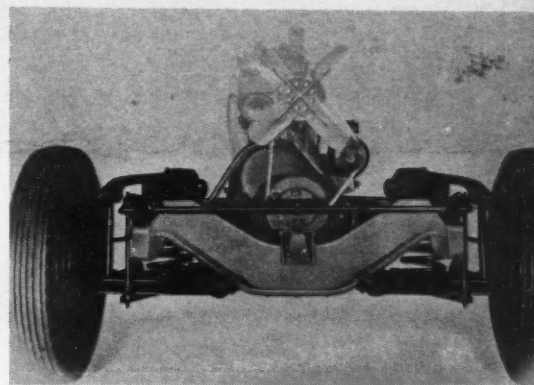
NASH continues its three lines of cars for 1940, with improvements in styling and comfort features. Prices have been reduced by from \$20 to \$50, and a special drive is to be made in the low-priced market, it is announced.

From the mechanical standpoint the most important change is undoubtedly the adoption of independent front suspension as standard equipment on all three lines. The arrangement is the familiar one with parallel wishbone-type links and coil springs, the latter being of silico manganese steel. Rear springing is by the conventional semi-elliptic springs. The cars also have a new steering system, and turning radii have been reduced. While cylinder dimensions remain unchanged, horsepower on the LaFayette has been increased to 99 hp. at 2400 r.p.m., the Ambassador six now develops 105 hp. at 3400 r.p.m.,

while the eight has been increased to 115 hp. at 3400 r.p.m.

New styling is one of the features of the Nash 1940 line. Hoods are long and narrow. At the front there is a narrow, fine-barred, die-cast grille, chrome-finished, which is flanked by two wide die-cast side grilles located in the catwalks. High crowned fenders and a molded edge on the catwalks combine to give the effect of an airplane wing. The sealed-beam headlamps are built into the fenders. Speed lines are carried from front to back, so that the rear fenders, roof and back contribute to the streamlined appearance. Bodies with either the conventional trunk back or a streamlined back are optional.

Automatic overdrives are again offered as optional equipment. These are of the new type with which the driver can return to direct drive at any time by merely



New independent front end suspension. A part of the new features contributing to Nash's "Arrow Flight Ride."

pressing the accelerator pedal all the way down.

Improvements have been made also in the Nash "conditioned-air" system for winter driving. The "Weather Eye," the device controlling this system, is this year mounted on top of the instrument panel near the windshield. The conditioned-air system comprises an air filter, a fan, a dehumidifier, and a conditioning chamber, the entire unit being located under the cowl. Air is drawn in through the cowl ventilator and passes the dehumidifier, where it is deprived of excess moisture. It then passes on to a processed filter and then to the warming chamber, where its temperature is raised in accordance with the setting of the control dial. With this system the interior of the car is constantly under a slight over-pressure, hence air can enter

(Continued on page 55)



PLYMOUTH *for* 1940

MANY changes have been made in the Plymouth for 1940, which has a longer (117-in.) wheelbase and is larger than its predecessor, containing 12 cu. ft. additional inside space. The weight has been redistributed by shifting both axles farther to the rear—the rear axle more than the front. Other new features include wider vision through the new type safety glass, sealed-beam headlights, an improved column-mounted shift lever which is now standard on both the Roadking and the DeLuxe; super-finish of certain engine parts, a new transmission designed to facilitate remote control, and “reminder” safety signals on all instruments.

All body styles this year come either with or without running boards. When without running boards, the cars come with fender guards and a chrome-decorated molding below the doors.

Driver's vision is improved by the higher and wider windshield

Longer wheelbase; more inside room; both axles shifted rearward; new transmission

and the one-piece curved-glass rear window that follows the contour of the rear panel. There is 95 sq. in. more glass in the windshield, and front-pillar sections have been made smaller to reduce the “blind spot.” All windows in the car are larger this year.

Rear doors are straight, with the cut-out usually necessitated by the rear wheelhouse eliminated, and both the Roadking and the DeLuxe this year have the rotary type door latch. Front-door hinges now are concealed. Windshield wipers now are mounted at the base of the windshield; they are vacuum-operated. A rear-deck stone shield, mounted between rear bumper and

body, is standard equipment on all Plymouths this year.

Frames are new and heavier this year, and they are so designed as to bring down the floor level of the car, lowering the center of gravity.

Springing is by coil springs in front and leaf springs with thinner, longer leaves in the rear. Spring-action is controlled by direct, double acting shock absorbers at all four wheels. Body insulation has been further improved.

The aluminum-alloy pistons now are tin-plated to protect both the pistons and the cylinder bore during the running-in period. An oil filter is now standard equipment.

(Continued on page 58)

PONTIAC *for* 1940



New shear type engine mountings; small six and eight have wheelbase increased 2 inches

by **JOSEPH GESCHELIN**

FOUR models, two of them featuring entirely new bodies, constitute the Pontiac line for the 1940 season. Series 40-25 is the Six on 117 in. wheelbase, 2 in. longer than last year. It has a newly styled body available in two- and four-door touring sedans, business and sport coupes. Series 40-26, the Six on 120 in. wheelbase remains substantially the same as last year except for refinements and changes in engine and chassis.

Series 40-28, the Straight Eight on 120-in. wheelbase remains substantially unchanged in specification details save for marked advances in styling and appointments. Series 40-29, the Straight Eight on

122 in. wheelbase, 2 in. longer than last year, boasts an entirely new type of body which is available only in four-door touring sedan and sport coupe models. Except for a new frame this model series incorporates the same changes and improvements that have been made in the Series 40-28.

In addition there is a Station Wagon furnished only on the Series 40-25 chassis; a Taxicab available on the Series 40-25 and 40-26 chassis.

Chrome trimmed running boards or running board skirts are optional on the Series 26, 28, 29. The Series 25 comes standard with chrome trimmed running boards.

Among the special features that may be emphasized at this point are the following: the newly developed sealed-beam headlamps with higher illuminating capacity and service facility are standard on all models. Parking lamps are a part of the fender-mounted headlamps, making it possible for Pontiac to offer as optional equipment a new type of direction signal which flashes turns at the parking lamp and stop light, simultaneously on either right or left side. It is controlled by a switch lever mounted on the steering column.

Improved smoothness on all engines is achieved by the introduction three, new shear type motor mountings, located in the same position as before, but designed to effect control of inertia torque and torque reaction. These mountings permit slightly more freedom about the neutral axle but are restrained from up-and-down, side-wise, or fore-and-aft movement.

Cylinder head is new on the Six with spark plug located directly over the intake valve, new combustion chamber contour with shrink-

(Continued on page 51)



STUDEBAKER *for* 1940

Emphasis on detail treatment to enhance eye appeal; all engines remain unchanged

STUDEBAKER enters the 1940 season with its three lines of cars—The Champion, Commander, and President—comparatively unchanged in styling and mechanical units. While the bodies and front and sheet metal remain unchanged, much has been done in detail treatment to enhance eye-appeal. Interior treatment and instrument panels are entirely new on Commander and President.

Wheelbase remains unchanged on all models. On the Commander and President the rear tread now is 61 in., up 1½ in., to provide increased width of rear seat.

Engines remain unchanged—The Champion, 6-cylinder, 3-in. bore x 3⅞-in. stroke, 164 cu. in. displace-

ment, rated 78 hp. at 4000 r.p.m. Commander is 6-cylinder, 3 5/16-in. bore x 4⅜-in. stroke, 226 cu. in. displacement, rated 90 hp. at 3400 r.p.m. President is 8-cylinder, 3 1/16-in. bore x 4¼-in. stroke, 250 cu. in. displacement, rated 110 hp. at 3600 r.p.m. Compression ratio is 6.5 to 1 on the Champion; 6.0 to 1 on the Commander and President, all with cast-iron heads. Early in '39 the piston and ring set-up on the Commander was changed by substituting two 3/32-in. compression rings for the ⅜-in. rings at the start of '39 production. This is continued for '40.

In front end styling, the die cast radiator grilles have about the same form as last year, but feature

a square cross-hatch pattern on President and Commander instead of the vertical bars employed last year. Windshield openings of Commander and President have been made higher to provide better visibility. The new type of high test safety plate glass used during the last five months of the previous season will be continued. Concealed hinges are found on all doors. The alligator hoods now are latched from the interior.

Sealed beam headlamps, fender-mounted, with parking beam mounted in the lower portion of the headlamp body, are standard on all models.

Overdrive is supplied as optional equipment on all models. The Planar independent front end suspension with cross spring is standard equipment on all models and remains unchanged. Due to the added load on the electrical system, generators of larger capacity are employed with current-voltage

(Continued on page 42)

A NEW MOTOR AGE FEATURE

In this issue, MOTOR AGE continues its brand new feature which will enable the mechanic to make more accurate estimates on how long it will take to repair a dented fender. As every mechanic knows estimating body and fender repairs is one of the most difficult jobs he has to do. No one has been successful in publishing any flat rate prices on fender and body repairs because no one has been able to answer the question how big is a dent.

However, with these untouched photographs in front of him to act as a guide, together with the time required for straightening and painting, every mechanic will be able to make an accurate estimate.

This MOTOR AGE feature will be continued for many months so that all types of damaged fenders, doors and panels will be illustrated. Keep these issues handy when estimating on body repairs.

Time based on the use of hand tools only. Power driven tools would reduce the time required for straightening.

How to Estimate BODY REPAIRS



Photograph taken at Paul Brothers, Philadelphia.

(Lower left), Time to straighten approximately 33 hours, refinishing approximately 4 hours.

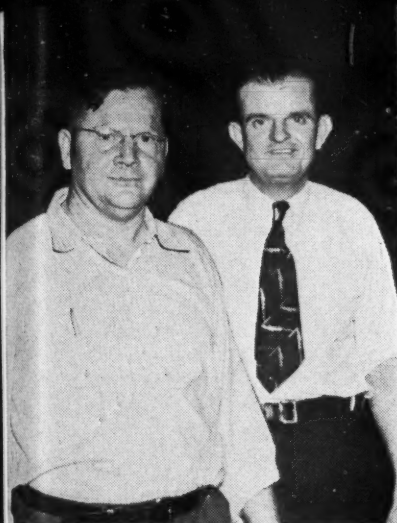
(Above) Time to straighten approximately 35 hours, refinishing time 4 hours. (Lower right),

Time to straighten approximately 25 hours, refinishing time approximately 2½ hours.





"Look at that! Only two spokes to wipe our hands on!"



MOTOR AGE SHOP OF THE MONTH

In the photograph on the left are Jesse Piland (left) and J. D. Elliott, joint owners of the shop on which our spotlight shines this month. Interior of their shop, in Austin, Texas, is shown below. They employ eight mechanics and both members of the firm work in the shop as occasion demands. Their shop orders average 500 per month; their gross income, from the shop only, averages \$2,900 monthly. They own and operate an independent service station and accessory and tire sales departments. The shop and all other features of the business are modernly equipped in every respect, and this location has the reputation of being one of the largest and most complete independent businesses of its kind in Austin.



THE READERS' CLEARING HOUSE

Service Men's Queries

FOURTH-RATE CUSTOMER

I recently read the item in the "Clearing House" in the August issue of *MOTOR AGE* entitled "Starter Sorrow" sent in by Al Luecks of Sheboygan, Wis., and feel that I am in a position to sympathize with him.

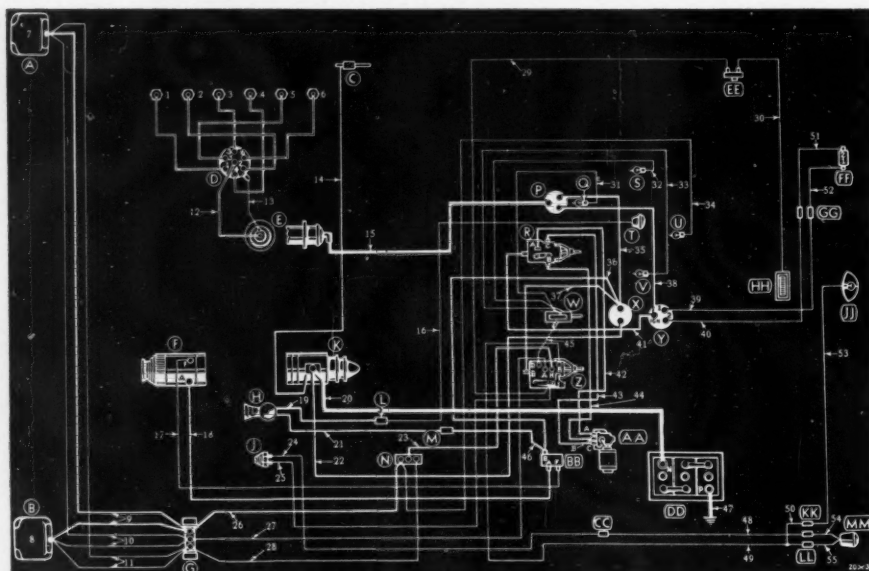
A few months ago a customer came in with a second-hand 1935 V-8 Ford which he had just bought. The starter was sluggish, noisy and would stick occasionally. I pulled the starter and found that the gear on the Bendix drive was badly chewed up and also the teeth on the flywheel were in bad shape. I told him it needed to have both gears replaced.

He brought the car in next day and we tore the job down and had the parts house install a new band on the flywheel and I installed a rebuilt Bendix drive on the starter. We re-assembled the job and when I started the engine, the starter engaged and turned the engine over all right, but when the engine commenced to fire the starter released with a bang you could hear for a mile. It sounded as if it had torn the whole engine to pieces. I could see nothing wrong with the way things were assembled and since the customer was standing around waiting for the car, I told him he could take it home, but to bring it back the next day.

When he brought it back the next day, I pulled the starter off and examined the gears. Both were slightly chewed on the edges so I blamed it on the Bendix gear and took it back to the parts house and told them of the trouble. They gave me another starter drive and when I installed it on the starter (after checking and straightening the starter shaft) and put the starter back on the car and started the engine, the starter would release with a jerk and bang which really sounded dangerous.

So, I drove the car down to the parts house. They had never heard anything like it, so one of the counter

(Continued on next page)



1939 DeSoto and Dodge Wiring Diagram

- | | | |
|---|--|---|
| A—Headlamp—right | DD—Storage battery | 21—Green |
| B—Headlamp—left | EE—Reading lamp pillar switch | 22—Red |
| C—Automatic choke | FF—Fuel gage (tank unit) | 23—Yellow |
| D—Ignition distributor | GG—Fuel gage cable connectors | 24—Red |
| E—Ignition coil | HH—Reading lamp | 25—Red |
| F—Generator | JJ—Rear license plate lamp | 26—Red (lower filament) |
| G—Headlamp wiring terminal block | KK—Rear license plate lamp cable connector | 27—Yellow (auxiliary bulb) |
| H—Horn (single) | LL—Tail and signal lamp cable connectors | 28—Black (upper filament) |
| J—Signal lamp switch | MM—Tail and signal lamp | 29—Red |
| K—Starter motor and switch | 1-6—Spark plug cables (high tension cable) | 30—Yellow |
| L—Horn ground cable connector | 7—Headlamp cables and sockets—right | 31—Black |
| M—Horn feed cable fuse connector | 8—Headlamp cables and sockets—left | 32—Black |
| N—Headlamp dimmer foot switch | 9—Red (lower filament) | 33—Black |
| P—Ignition switch and lock | 10—Yellow (auxiliary bulb) | 34—Red |
| Q—Ignition switch lamp | 11—Black (upper filament) | 35—Brown |
| R—Windshield wiper switch and fuse | 12—Secondary cable (high tension cable) | 36—Black |
| S—Instrument lamp | 13—Primary cable (black) | 37—Brown |
| T—Horn button | 14—White | 38—Blue |
| U—Headlamp bright beam indicator lamp | 15—Ignition lock switch cable | 39—Blue |
| V—Instrument lamp switch | 16—Black | 40—Brown |
| W—Instrument lamp | 17—Green | 41—Red |
| X—Ammeter | 18—Red | 42—Green |
| Y—Fuel gage (panel unit) | 19—Green | 43—Brown |
| Z—Head and tail lamp lighting switch and fuse | 20—Starter cable and terminal (—) negative | 44—Red |
| AA—Windshield wiper motor | | 45—Black |
| BB—Generator voltage regulator | | 46—Green |
| CC—Signal lamp feed cable connector | | 47—Battery ground cable and terminal (+) positive |
| | | 48—Red (signal lamp) |
| | | 49—White (tail lamp) |
| | | 50—White |
| | | 51—Brown |
| | | 52—Blue |
| | | 53—White |
| | | 54—Red (signal lamp) |
| | | 55—White (tail lamp) |

(Continued from preceding page)
men went along with me to the place where they have their starter drives rebuilt.

They had never heard of such a thing either, and gave me another drive to try which I installed while there, but it acted just the same.

So, I took the car back to the shop and pulled the flywheel out for the second time and took it down to the parts house where they installed another ring gear—thinking that the first one might have been defective.

This time I did not put the engine back in the car, but hooked it up to battery and gasoline supplies and tried it on the bench. It still was no better. Then I checked the flywheel with a dial gage and it was almost

perfect. Everything looked and measured up right only the starter released with a violent jerk and bang.

So, after sitting down and thinking about it for awhile I decided the only thing we had overlooked was the alignment of the starter with the flywheel. On a Ford, the starter bolts on to the oil pan so I went out and bought a new oil pan. When this was installed and the engine started, the starter released perfectly. I installed the engine in the car and after starting and stopping it a good many times without any more trouble, I thought the trouble was licked.

When the customer got the car he made an excuse for not paying for the new oil pan and said he would see me tomorrow. When we met him

on the street about a month later and suggested that he finish paying his bill he said he didn't intend to pay because the starter still didn't work right. He said it still stuck every couple of days and when he took the car into a Ford dealer shop they had examined the gears and told him he had been gyped because they were old gears and had never been replaced.

So now the score reads—we almost broke even on the money we spent—we lost two days work—and one third or fourth-grade customer. And, I still am not sure what was the matter with that Ford.

The flywheel gear used both times was a good one and the starter drive was rebuilt by a reputable firm. I have never had any trouble with these parts before so I don't think the material used was at fault. The flywheel ran true and the clutch and all other parts functioned properly.

Here's hoping that Al Luecks has better luck than I had. C. D. Ketelle, Ketelle's Auto Repairing, 141 W. Jefferson Blvd., Los Angeles, Calif.

YOU have certainly had a whole lot of trouble on that starter on the Ford. I really think that you fixed the trouble when you installed that new oil pan as you described. It certainly is too bad that you didn't get paid for the work, however, and I think the owner just said that it wasn't working as an excuse not to pay you. However, that's one of those things you never can be sure about.

Here's hoping that you get a couple of hundred first-rate customers to replace that one fourth or fifth-class which you have lost.

GAS MILEAGE

I am asking you for some information concerning gas mileage on a 1939 Ford 60 hp., two-door sedan. The best it will do is 20½ average on 2000-mile trip. This car has been checked twice by other shops. Fuel pump pressure is O.K. New distributor was installed, spark plugs are O.K. What would you suggest? Would another type carburetor help? The mileage is 3500 miles. C. H. Peyton, Partlow Garage, Partlow, Va.

THERE are so many factors that enter into gasoline consumption that it is pretty difficult to say what might be of assistance in this particular case. Personally, I am inclined to the opinion that the reason that this motor is unable to get better mileage is due entirely to the owner's type of driving. He is getting a little better than 20 miles per gallon without paying any particular attention to economical driving and I believe that performance can be considered entirely satisfactory. He must consider that on a 2000-mile trip, which is evidently the trip on which he is basing gasoline performance, there are a number of times during which the car is standing still with the engine idling

due to traffic light and other road conditions and then there are times during which he is driving at relatively high speed—accelerating, etc. It seems to me that over an average of 2000 miles, if he can obtain 20 miles per gallon he should be satisfied.

The only way to accurately determine just what the gasoline consumption of the car is would be to run a test, using a measured amount of gasoline in a separate tank leading directly to the carburetor. The test should be made at a constant driving speed until the supply of gasoline is exhausted. In other words, the standard gasoline mileage testing instrument contains 1/10 of a gallon of gas. This is hooked up to the carburetor and the car driven at a steady speed of 20 miles per hour until the gasoline supply is exhausted. Mileage covered is then checked. Another test is run at a steady driving speed of 40 m.p.h. under the same conditions and another reading taken. This can be duplicated at any speed but it should be taken preferably at the average speed at which the owner drives. In other words, if he drives normally at 50 m.p.h.—where road conditions permit—then it would be well to run a test with this car driving it at 50 m.p.h. If you can show satisfactory gasoline mileage at any one of these tests but particularly at the 50 mile an hour speed test, it indicates that the car is performing up to standard. If, on the other hand, the owner in driving over a period of time does not obtain the same rate of gasoline consumption as was shown by the test, the difference is due entirely to the manner in which he drives and, of course, is a condition that cannot be corrected by making mechanical adjustments to the car.

I certainly would not recommend that you attempt changing the carburetor or doing other mechanical work until after you have made a gasoline test to see just what this car is capable of doing at a consistent driving speed.

CLUTCH TROUBLE

I have had trouble with clutch throw-out bearings on some Chrysler, Dodge and DeSoto cars when the clutch has to be removed and replaced. After clutch is replaced a decided whine occurs in clutch release bearing. When the clutch is again removed and bearing examined, it seems to be O.K. but when new bearing is put in the whining stops. Can you tell me the cause of this? It occurs on DeSoto '32, Dodge '37, etc.

THE only reason I can think of why the release bearings should suddenly decide to make a noise is that when you have the clutch out, you are not setting the clutch release fingers evenly. One of them is very likely a little bit out-of-line when



TROUBLE?

If you are stuck with a puzzling repair job that just won't turn out right, write to BILL TOBOLDT, Editor of MOTOR AGE. Each month we present here a few of the numerous queries received. We'll try to straighten out your problems for you. Don't cuss—write us!

compared with the others which would result in the release bearing being slightly cocked when under pressure. Installing a new bearing would eliminate this noise up until the time the new bearing began to show some wear and then the noise would return. More accurate adjustment of the release fingers should overcome your trouble.

BRAKE ADJUSTMENT

We have a 1936 Oldsmobile eight in our shop with a brake condition. We relined the brakes with a moulded lining and after a major adjustment, didn't touch them for over eight months. Now they grab and pull to the left. We inspected the lining and it was O.K., wearing even, and no grease or fluid. After adjusting they would be O.K. for about 200 miles then the old trouble would come back again. Could you please straighten us out on this?

We also had a 1935 DeSoto on which we installed rings, pins, rod and main bearings and still the oil pressure will not run over 25 lbs. on the road. How can we correct it? Paul Wendland, "Motor Hospital," Altoona, Pa.

THE first point I would check would be the brake drum to be sure that it is true. If the drum is slightly out-of-round it will cause this trouble. The next point I would check would be to go through a major brake adjustment and pay particular attention to the location of the brake anchor to

be sure that the shoes are centrally located within the drum. Also check the brake backing plate to be sure that the bolts are tight. Inspect the wheel cylinder on the right front wheel for leaks. If you find one of these points to be at fault, when you have corrected it, you will have eliminated the trouble.

The 1935 DeSoto, which has low oil pressure, is another story. My first suggestion is that you make an oil pressure test on these bearings to determine just how much oil is being allowed to leak by. I believe this will give you the answer to your low oil pressure trouble and will mean that you will very likely have to do some work on the shaft to make the bearing journals true before you will be able to hold oil pressure. Don't overlook the camshaft bearings for oil leaks as sometimes they are the cause of the trouble.

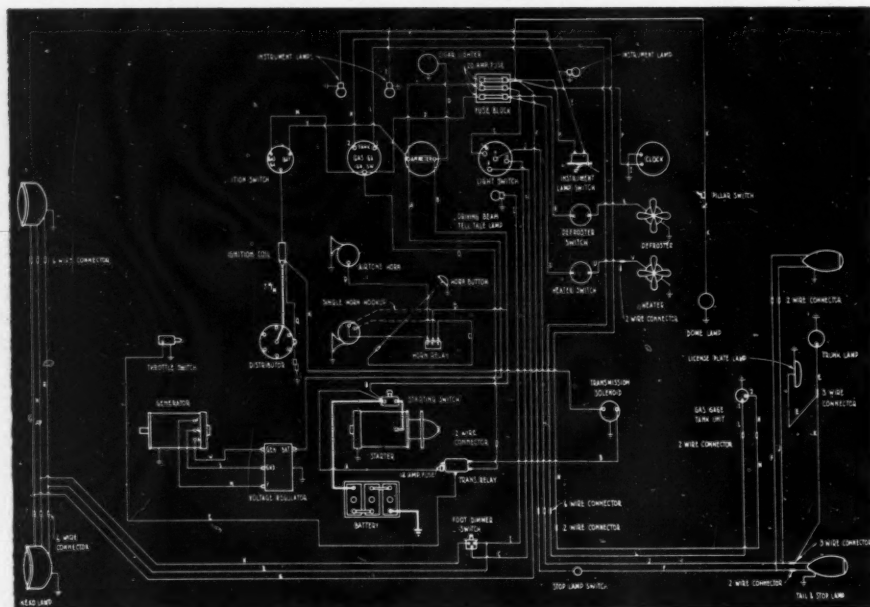
OIL PRESSURE

I have a 1929 Dodge Victory Six. Before the car was brought to me another mechanic tightened the rod bearings by filing them. When he had the car together and started he only had 10 lbs. oil pressure. He gave the job up then. The owner brought the car to me to see what I could find wrong with it. I questioned him about what the other mechanic had done and how he did it. He told me he had filed the rod bearings. I suggested we put in new rod bearings. We put in the new bearings and I put the car together and started it. I had the same trouble. I didn't have an oil pressure test tank then but bought me one right away. I ran a test on the car and found the main bearings leaking. I told the owner we had better put in new bearings, but he said he couldn't afford new main bearings unless they couldn't be fixed any other way. The main bearings had never been filed so I filed them and ran a test and all bearings were O. K.

The only place there was much oil leaking was at the front of the crankshaft in the timing gear case, but didn't seem like more than should come from there. I had already tested the oil pump before putting in the new rod bearings. I found it O.K. I then put the car together and now have 5 lbs. oil pressure at idling speed and 25 lbs. at 30 m.p.h. The normal reading on this car was 40 lbs.

I have never filed the bearings in a high pressure oiling system before. Now the question—Will this car be a success with only that much pressure or is the trouble with filing those main bearings? Must they also be new ones to bring the oil pressure up to 40 lbs.? Albert Pant, R. 3, LaGrange, Ind.

I THINK you have done all you can to bring this oil pressure up since you have filed the caps of the main bearings. Of course, you realize that
(Continued on next page)



1939 Studebaker Champion Model G, Wiring Diagram

Code Letter	Wire Color and No.	Code Letter	Wire Color and No.	Code Letter	Wire Color and No.	Code Letter	Wire Color and No.
A	10 Black	H	14 Yellow	M	12 White & Black	R	14 Red
B	10 Red	I	16 White	N	18 Black	S	14 White & Red
C	14 Red & Black	J	16 Black & Oak	O	16 Yellow & Red	T	16 Silver
D	14 Black	K	16 White & Black	P	16 White & Red	U	12 Blue
E	16 Black	L	18 Black & Red	Q	16 Black & Green	V	12 Black
F	16 Red					W	10 White
G	16 Green						

(Continued from preceding page)

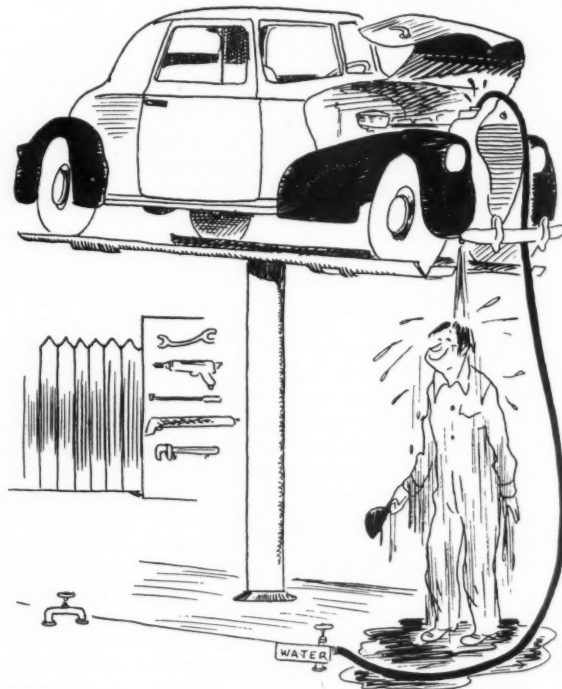
these main bearing caps should not have been filed but, instead, new bearings should have been inserted in the caps. By filing the caps you make them out-of-round so that there is a contact at the top and bottom of the shaft but a space on each side. After the job has been driven awhile and the center of the bearing—top and bottom—wears, then there is a space all the way around the bearing and this space is wider on the sides than it is on the top and bottom. This causes considerable loss of oil and, of course, loss of oil pressure. The same applies to the connecting rod bearings.

This job will very likely operate all right for a few thousand miles, then it will begin to lose oil pressure when the engine is hot. When this takes place, there is nothing further you can do to restore oil pressure except to turn down the bearing journals, install new undersize bearings and, in the case of the main bearing caps that have been filed, you will have to replace those with new main bearing caps in order to restore the perfect circle. Considering the fact that this is a 1929 model car, the expense of this operation would be out-of-line with the value of the car and very few owners would agree to having this work done.

One very important point to check is loss of oil at the camshaft bearings which can be checked with a pressure test.

If you care to advise the owner, I think the only honest advice you can

give him is that he can continue to drive this car until the oil pressure begins to drop down to around 5 or 10 lbs. at driving speed when the engine is hot and then he will either have to have the work done as outlined above or trade the car for another one.



"He finished flushing the radiator an hour ago—now he's just taking a shower!"

HYDRAULIC VALVE LIFTERS

I have a 1936 Cadillac 60 series with which I am having trouble due to a noise in the hydraulic valve lifters. New lifters have been installed which eliminated the trouble for about 24 hours. The noise is similar to that produced by conventional valve lifters with excessive tappet clearances.

Can these hydraulic lifters become air bound and, if so, how can this condition be corrected? Edwin C. Green, Weston, Mass.

THERE are several possibilities which might cause the noisy operation of the Cadillac valve lifters. 1—There may be dirt in the mechanism. 2—Incorrect clearance between the silencer plunger and cylinder. 3—Leakage of check valve. 4—Wrong operating clearance between rocker arm and push rod. 5—Clogged oil filter.

When it comes to adjusting the valves, back off adjusting screw until shoulder on plunger is flush with dash pot. Loosen lock nut and adjust valve clearance and push plunger down until bottom of hole is on level with or slightly below upper edge of dash pot. Turn adjusting screw down until all clearance is taken up at both ends of rocker arm. Release plunger and back off adjusting screw to locate plunger in correct position.

DIRT—or carbon particles anywhere in the silencer mechanism may cause noisy operation and excessive wear. The remedy is thorough cleaning of all parts in gasoline. Note: Whenever the valve cover is removed and the valve silencers are exposed,

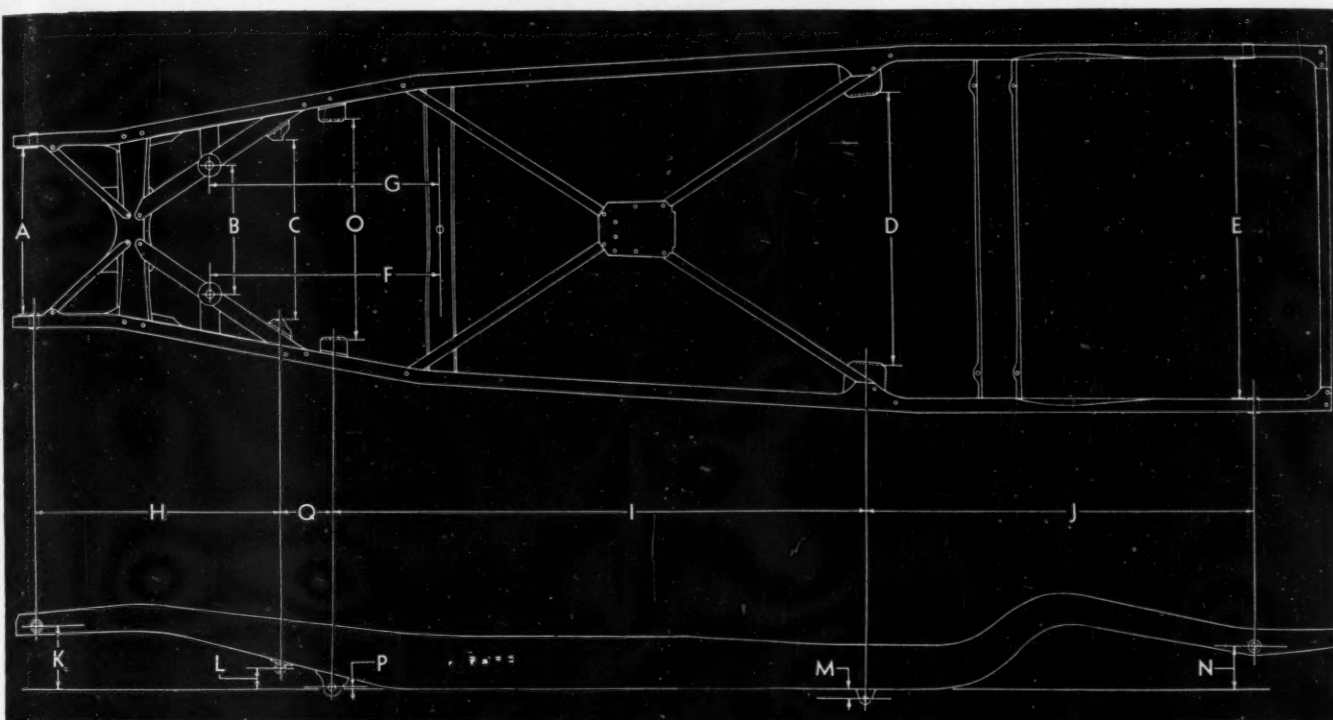


Figure 1716

Model	W. B.	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q
90	112"	20 $\frac{1}{2}$ "	16 $\frac{1}{2}$ "	28 $\frac{1}{2}$ "	37 $\frac{1}{2}$ "	43 $\frac{1}{2}$ "	29 $\frac{1}{2}$ "	29 $\frac{1}{2}$ "	31 $\frac{1}{2}$ "	72 $\frac{1}{2}$ "	45 $\frac{1}{2}$ "	73 $\frac{1}{2}$ "	13 $\frac{1}{2}$ "	13 $\frac{1}{2}$ "	5 $\frac{1}{2}$ "	28 $\frac{1}{2}$ "	1 $\frac{1}{2}$ "	6 $\frac{1}{2}$ "
91 and 92	118"	21 $\frac{1}{2}$ "	16 $\frac{1}{2}$ "	22 $\frac{1}{2}$ "	34 $\frac{1}{2}$ "	43 $\frac{1}{2}$ "	29 $\frac{1}{2}$ "	29 $\frac{1}{2}$ "	31 $\frac{1}{2}$ "	75 $\frac{1}{2}$ "	49 $\frac{1}{2}$ "	81 $\frac{1}{2}$ "	23 $\frac{1}{2}$ "	13 $\frac{1}{2}$ "	5 $\frac{1}{2}$ "	28 $\frac{1}{2}$ "	1 $\frac{1}{2}$ "	6 $\frac{1}{2}$ "
93	122"	21 $\frac{1}{2}$ "	16 $\frac{1}{2}$ "	22 $\frac{1}{2}$ "	34 $\frac{1}{2}$ "	43 $\frac{1}{2}$ "	29 $\frac{1}{2}$ "	29 $\frac{1}{2}$ "	35 $\frac{1}{2}$ "	77 $\frac{1}{2}$ "	49 $\frac{1}{2}$ "	83 $\frac{1}{2}$ "	23 $\frac{1}{2}$ "	13 $\frac{1}{2}$ "	5 $\frac{1}{2}$ "	28 $\frac{1}{2}$ "	1 $\frac{1}{2}$ "	8 $\frac{1}{2}$ "
95	122"	21 $\frac{1}{2}$ "	16 $\frac{1}{2}$ "	22 $\frac{1}{2}$ "	34 $\frac{1}{2}$ "	43 $\frac{1}{2}$ "	36 $\frac{1}{2}$ "	38 $\frac{1}{2}$ "	35 $\frac{1}{2}$ "	77 $\frac{1}{2}$ "	49 $\frac{1}{2}$ "	81 $\frac{1}{2}$ "	23 $\frac{1}{2}$ "	13 $\frac{1}{2}$ "	5 $\frac{1}{2}$ "	28 $\frac{1}{2}$ "	1 $\frac{1}{2}$ "	8 $\frac{1}{2}$ "
97	129"	21 $\frac{1}{2}$ "	16 $\frac{1}{2}$ "	22 $\frac{1}{2}$ "	34 $\frac{1}{2}$ "	43 $\frac{1}{2}$ "	36 $\frac{1}{2}$ "	38 $\frac{1}{2}$ "	35 $\frac{1}{2}$ "	84 $\frac{1}{2}$ "	49 $\frac{1}{2}$ "	83 $\frac{1}{2}$ "	23 $\frac{1}{2}$ "	13 $\frac{1}{2}$ "	5 $\frac{1}{2}$ "	28 $\frac{1}{2}$ "	1 $\frac{1}{2}$ "	8 $\frac{1}{2}$ "
98	119"	20 $\frac{1}{2}$ "	16 $\frac{1}{2}$ "	28 $\frac{1}{2}$ "	34 $\frac{1}{2}$ "	43 $\frac{1}{2}$ "	29 $\frac{1}{2}$ "	29 $\frac{1}{2}$ "	31 $\frac{1}{2}$ "	76 $\frac{1}{2}$ "	49 $\frac{1}{2}$ "	73 $\frac{1}{2}$ "	13 $\frac{1}{2}$ "	13 $\frac{1}{2}$ "	5 $\frac{1}{2}$ "	28 $\frac{1}{2}$ "	1 $\frac{1}{2}$ "	6 $\frac{1}{2}$ "

*Dimension C taken to inside face of U shaped spring hanger.

**Radial safety control not used on these models.

1939 Hudson—Terraplane Frame Dimensions

they should be kept covered to prevent dust and dirt from settling in the mechanism.

INCORRECT CLEARANCE—between plungers and cylinder walls may be due to excessive wear, which would necessitate replacement; or to the interchanging of the plungers.

The plungers and dashpots are not interchangeable, and they are marked to insure correct assembly. The number of marks etched on the plunger should correspond with the number of marks appearing on the dashpot casting.

LEAKAGE OF THE CHECK VALVE—is usually due to particles of foreign matter being lodged on the valve seat. This can be corrected by thorough cleaning. When reinstalling, revolve the check valve on its seat to assure its being properly seated.

JUMPS OUT OF GEAR

I am having trouble with a 1936 Chevrolet Master transmission jumping out of high gear and while I have had it down twice and replaced any parts that looked worn, I have not stopped the trouble.

Could you please send me any answers that will help me on this one?
Ted Knowland, Automotive Service Garage, 5179 Long Beach Blvd., Long Beach, Calif.

THIS condition is usually caused by misalignment between the transmission case and the clutch housing. It is usually corrected by installing a new gasket between the transmission case and the clutch housing and then by installing an additional gasket at this point. The additional gasket should be torn in half horizontally and the lower half only installed. This has the effect of raising the rear end of the transmission slightly and providing proper alignment.

You might also file the notches in the shifter rails deeper in the high gear position and install new poppet springs to stiffen the action.

OIL TROUBLE

I am having trouble stopping oil in a 1937 Model 120 Graham with a Supercharger. I have installed two sets of rings. Put rings on intake valve stems. Overhauled fuel pump, installed new oil seal in Supercharger. This car has gone 37,000 miles. After installing new rings car only made 165 miles on a quart of oil. I then installed another make of rings and the oil mileage is about 265 miles on a quart of oil.

The exhaust smokes badly when engine is speeded up. Lynn Davis c/o Reid Auto Service, 450 Fawcett Ave., Tacoma, Wash.

YOU apparently have done considerable work in an effort to prevent oil consumption such as installing new rings, new valve guide packing and a new oil seal in the supercharger. That last is very important because it is quite often the cause of excessive oil consumption in this model.

Your next step should be a check of main and connecting rod bearings by making an oil pressure test to determine just how much oil is being thrown off at these points. But more particularly, oil that is being thrown off by the connecting rod bearings. I notice that this car has been driven 37,000 miles and by the time this mileage has been accumulated, it is usually necessary to install new insert bearings in the connecting rods. As you know, these bearings are of the slip-in type and do not necessitate replacing the complete rod.

My first suggestion, therefore, after you have made a test of the bearings is to install new bearing inserts in the connecting rods. I believe the old bearings are slightly loose to the extent that they are throwing more oil up on the cylinder walls than the rings can take care of. This bearing installation is not particularly expensive and is to be expected between 30,000 and 40,000 miles. I believe this will correct your trouble.

Colonel Roscoe Turner, of Chicago, became the world's number one air race pilot when he won the Thompson Trophy closed course classic for the third time. Turner is pictured to the right shaking hands with Fred Crawford, president of Thompson Products and donor of the \$37,500 trophy. The Colonel announced that this event ended his long and colorful racing career as he intends to retire from race flying. Turner's speed during the race was 232.536 m.p.h., less than a mile slower than the record he set for the last 300 mile classic at Cleveland.



Race Schedule Nears Close

A 250-mile stock car race at Roosevelt Raceway, postponed several times since the original August date, and 10 sprint programs were all that remained on the automobile racing schedule of the American Automobile Association as October opened.

The big car schedule will close Nov. 4 when Ira Vail runs the final events of his two-day speed program at the Savannah Speedway. A sprint program earlier scheduled for Oct. 21 at Wilmington, N. C., has been postponed.

The stock car race, similar to the race for everyday motorists staged July 4 at Langhorne Speedway, near Philadelphia, Pa., is now listed for Oct. 8. The event was under direction of Ralph DePalma, national champion driver of the old school of big time racing.

Shaw to Receive Championship Crown

Wilbur Shaw, winner of the 1939 International Sweepstakes at Indianapolis, will be announced by the American Automobile Association Contest Board as national auto racing champion, MOTOR AGE was advised at national headquarters of the sport's governing body.

Although official designation of Shaw as champion had not been made, the official AAA point roster credits Shaw with a lead of more than 300 point over his nearest living rival.

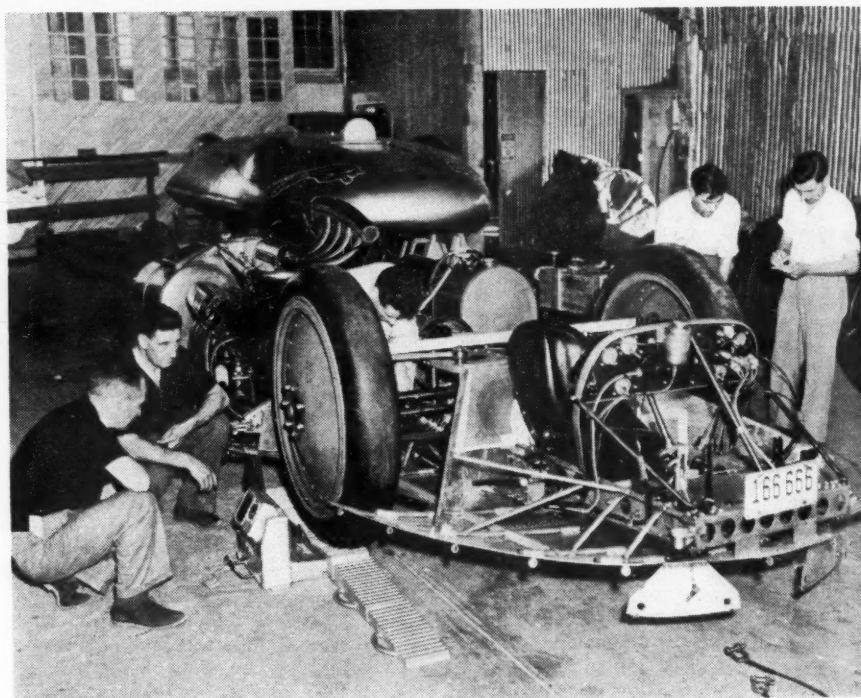
Shaw has 1000 points for the victory earned at Indianapolis in the 500-mile classic May 30. Ted Horn, riding in third place, Shaw's nearest living rival, has 685.

Second place honors will be awarded posthumously to Jimmy Snyder, who died this year in a midget auto race some time after he had finished second at Indianapolis. Snyder is credited with 825 points.

Diamond studded gold medals will be awarded to Shaw and to Horn next year just before the start of the Indianapolis classic. The second place medal will be presented to a member of Snyder's family.

Oil Filter Research at Mellon Institute

Dr. Edward R. Weidlein, director, Mellon Institute, Pittsburgh, has announced the establishment of an in-



John Cobb's racer, which recently established a new mile speed record of 368.85 m.p.h., is shown as mechanics worked on it shortly before the run. The well streamlined car was powered with two Napier engines developing 2600 horsepower.

dustrial fellowship in that institution by the Fleming Manufacturing Co., Providence, R. I. This fellowship will study the design, construction and operation of oil filters. One aim will be to obtain new knowledge to bring about improvements in the products of the donor.

Dr. Glenn O. Ebrey, who has been appointed to the incumbency of the fellowship, received his professional education at Illinois College (B.S., 1924) and at the University of Pittsburgh (Ph.D., 1931). During 1931-32 he was research chemist with the Sinclair Refining Company, research and development division, East Chicago, Ind. For the past seven years—up to July, 1939—he was chief chemist of the Pennzoil Company, Oil City, Pa.

Aid to Car Washing

A new product known as Wonder-Weld Magic Car Wash has been added to the line of products made by the Miller Mfg. Co., Camden, N. J. One ounce of this self-drying car wash is poured into a 10 or 12 quart bucket, which then is filled with hot or cold water to make the solution. The vehicle is washed then, with surfaces completely covered. Then it is hosed off, with nozzle removed. The surface is said to dry spotlessly clean, with no streaks. No chamoising to remove water and streaks is necessary. The product is said to be non-injurious to car finish. It is packed in pint and gallon cans, and in 30 and 55 gallon drums.



The United States intends to exert every effort in keeping out of the European war. Even so, should Uncle Sam be forced into the conflict, he intends to have both fists swinging from the very start. Now the air force is developing trained pilots faster than ever before as a precaution against possible difficulty. Training of cadet pilots and air corps mechanics is now being farmed out to commercial schools. Here two of the embryo cadets are shown at work on a plane engine at the school at Grand Central Air Terminal at Glendale, Cal.

DeVilbiss Fall School

The DeVilbiss Company announces the schedule of their training school for the last three months of 1939.

This school is open to industrial painters, master painters, automobile refinishers and all others interested in learning the technique of spray-painting and the use and care of spray-painting equipment.

The training period lasts for one week. Classes will start on Oct. 9 and Nov. 6.

Special rates in Toledo hotels and boarding-houses near the plant have been secured by the company for men attending the school.

These classes have been well attended in the past because of the facilities for study, otherwise unobtainable, offered by The DeVilbiss Laboratories.

It is advisable to enroll in the school as far in advance as possible, the company reports, since the size of the classes must be limited and since there will be no training periods other than those announced. Complete information may be obtained by writing The DeVilbiss Company, Toledo, Ohio.

Hygrade Purchases

Factory Building

For the third time in five years the Hygrade Products Co. moves to larger quarters in order to keep pace with the expansion of its business. The company's new home, acquired by purchase, is a concrete factory building of modern construction, located in Long Island City, N. Y.

An enlarged laboratory, equipped with new testing devices and special tools, has been planned by Hygrade's Engineers, to facilitate the experimental work essential in solving numerous problems that come up in connection with the manufacture of "engineered" replacement parts.

Hygrade customers visiting New York are invited to inspect this modern plant. The address is 35-35 Thirty-fifth Street, Long Island City, New York, a 10-min. run from Grand Central by subway.

Miller Appoints Lanser

At a recent director's meeting, Lee Lanser, formerly assistant sales manager of Miller Manufacturing Co., was appointed western sales manager. He has been with the Miller company about four years.



The European war is already affecting the normal lives of British civilians at home. The picture shows forms for gasoline ration cards being issued to applicants. Small rations have cut private driving and taxis are used only to noon.

Valvoline "X-18"

A new all-season, all-purpose gear lubricant that is said to do the jobs of 18 individual types of lubricant, has been introduced by Valvoline Oil Co., 525 East Fifth St., Cincinnati, Ohio, under the name of Valvoline "X-18."

The manufacturer declares that this new product simplifies the lubrication problem since it makes unnecessary so large a stock of various grades of gear oils and lubricants, and speeds up the work of the lubrication department. According to the manufacturers valvoline "X-18" may be used in all places where the following grades are customarily specified: Gear Oils of SAE 80, 90, 140 and 250 grade; Heavy Duty Gear Oils of SAE 90, 140, (140

light), and 250 grade; Extreme Pressure Gear Oils, SAE 80, 90, 140 and 250; Hypoid Gear Lubricants SAE 80, 90; Steering Gear and Worm Gear Lubricants 110 and 160.

Valvoline "X-18" is available in 5-lb. tins, 25-lb. pails, or 100-lb. and 400-lb. drums.

Ki-Sol Succeeds Carleton

Announcement has been made of the formation of KI-SOL Corp., to succeed Carleton Products Co., St. Louis, Mo.

Felix J. Vaillancourt, formerly with Briggs & Stratton Corp., is the new sales manager, and will have full charge of sales and sales organization in the United States and Canada.



As we go to press, Al Laansma, our Merchandising Editor, advises us from Detroit that September production of passenger cars and trucks will total about 180,000 units—which is quite a boost over August and just about double the September output last year.

* * *

Hudson announces that it has been granted a patent on its "Auto-Poise" stabilizer mechanism. The patent is a basic one, the company says, applying to any type of stabilizing attachment directly connected to the wheels.

* * *

Improved status of the automobile industry this year is reflected in the U. S. Bureau of Labor statistics indicating that employment during the first half of the year was a third more than in the first half of 1938, while average weekly payrolls were more than half again those of the first six months of 1938.

The number of workers averaged 403,000 against 301,000 last year and wages amounted to 12 million dollars per week.

* * *

Dealers in automotive replacement supplies and those engaged in motor vehicle repair work generally, can safely increase their stocks of merchandise as conditions will continue to improve, Wilson S. Isherwood, general sales manager of the AC Spark Plug division of General Motors, notified his nation-wide selling organization after a survey of conditions in the parts and accessories field.

* * *

Plans for a new plant to be erected in St. Marys, Ohio, have been announced by Goodyear Tire & Rubber Co. The plant, covering 60 acres, will be devoted to the manufacture of mechanical rubber goods. Manufacturing operations are expected to be under way by Jan. 1.

* * *

Studebaker plans to go after the 1940 market in a big fashion. More than one million dollars have been appropriated for the introductory campaign alone. The money will promote a coordinated newspaper, magazine, direct mail and radio drive on car buyers.

* * *

On Jan. 11, 1938, Chevrolet started one of its trucks on a dependability run. The truck has now passed through most of these United States and parts of Canada and Mexico and continues to roll merrily on its way. Recently it passed the 70,000 mile mark and a few figures on its performance to that point may be of interest to you.

Speed to the 70,000 mile mark averaged 32.37 m.p.h., with an average gasoline mileage per gallon of 15.12. The original tires ran nearly 33,000 miles before replacement. Cost of

regular maintenance (mechanical work, periodic inspections and replacements) was \$250.11 for the 70,000 miles and the truck averaged 1160 miles per quart of oil consumed. The total cost of operation to that mark (including fuel, oil, maintenance, etc.) was \$0.01818 per mile, or \$0.00393 per ton-mile.

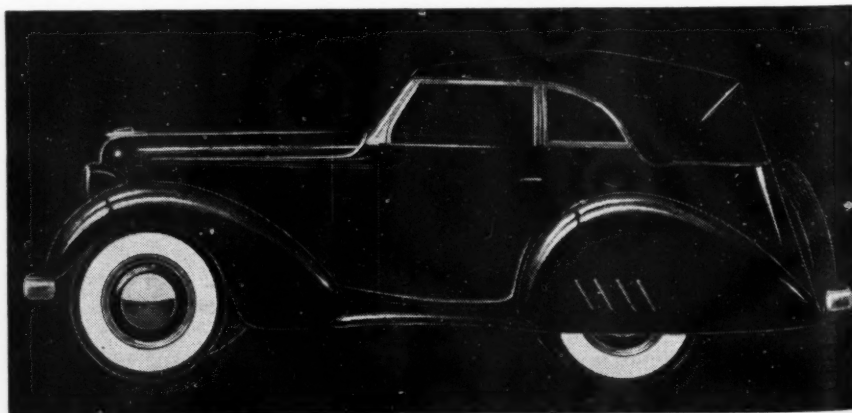
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Caterpillar Tractor Co. has announced the addition of a four-cylinder, 35 hp., model D4400 engine to its line of marine Diesels. The new engine is medium speed, medium weight, and suited to the work boat field.

Drawings for A.S.I. Show Space

Unusually heavy attendance at the Automotive Service Industries Show space drawing, held in New York at the Hotel Astor on Sept. 8, is taken as evidence that manufacturers are planning to make the show play an important part in launching their 1940 marketing programs. Interest in the show, as indicated by the number of space applications and the amount of space reserved, also serves to demonstrate the industry's strong confidence in business prospects.

A total of 339 manufacturers, including a few purveyors and a number of trade publications, drew for space. Their applications called for 950 booths totaling more than 105,000 sq. ft. of display space. This represents a gain of approximately 2000 sq. ft. of display space over the amount actually used for the 1938 show; and past experience has shown that between the time of the space drawing and the opening of the show some 10 or 15 additional manufacturers will apply for space.



BANTAM SUPER 4 CONVERTIBLE SEDAN

Bantam celebrates the beginning of its third production year with a new convertible sedan and coupe. The new model is mounted on an entirely redesigned chassis and powered by the new "Hillmaster" engine with three-bearing crankshaft. Other features include: new glideaway clutch, new carburetion, new engine mounting, new manifolding, new oil pumps, new brakes and new gear shift lever design.

Pete Alberts Killed In Race Crack-Up

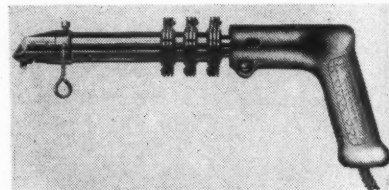
Pete Alberts, well-known race car driver and manager of midget auto racing activity in the St. Louis area, died at the Mount Vernon, Ill., hospital on Sept. 17 from a fractured skull suffered in a big car dirt track race at Mount Vernon on Sept. 16. According to reports, Alberts drove through the fence and was thrown 20 ft.

During the past two years Alberts divided his racing time between driving big cars and promoting the weekly races at the Cahokia, Ill., midget auto track. Pepper Martin, the St. Louis Cardinals' baseball team's race-minded player, hired Alberts to do his driving when he purchased a midget car several years ago.

During the few years Alberts raced under the banner of the Central States Racing Association he used the name of Pietro Alberti. Ironically enough Alberts earlier in the summer had accompanied the body of Jimmy Snyder to Chicago, after the Windy City midget star was killed in an accident on the Cahokia track.

Champion Tire Regroover

Important improvements in the Champion Electric Tire Groover have been announced by O. E. Thompson & Sons, Ypsilanti, Mich. Outstanding features are: clear vision guide point, 3-piece removable groover head, constant heat which will not burn



rubber, cool operation for the operator through air-cooled ventilating fins, pistol safety grip handle, easy to use. Each groover is equipped with rubber covered cord with non-breakable plug, tire marker, grooving guide, shims, blades, wrench and blade sharpening file.



VALVOLINE X-18 NEW ALL-SEASON, ALL-PURPOSE GEAR LUBE GETS INSTANT RESPONSE COAST TO COAST—18 LUBRICANTS REPLACED—DEALERS LIKE NEW CONVENIENCE AND PROFITS

● Valvoline X-18, the new all-season, all-purpose gear lubricant is an instant hit! Dealers everywhere were quick to realize the advantages of having one lubricant for all gears, and all seasons. X-18 meets or exceeds manufacturers' latest specifications such as General Motors G.M. 4664 M.

* * *

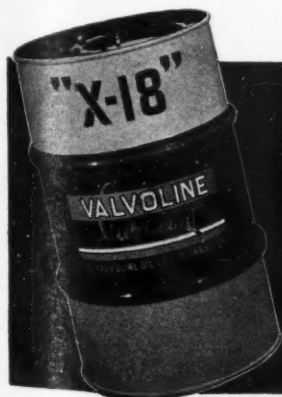
You make more money in the lube department when you go to X-18 because: 1. There are no drum changes. 2. You can handle more jobs per day. 3. Your inventory is greatly reduced

(for 18 lubricants are replaced). 4. There are no seasonal change-over inventory tie-ups. 5. You make fall and spring changes out of the same drum.

Valvoline X-18 has been thoroughly tested. It is made from Pennsylvania stock. Packed in 5-pound tins, 25-pound pails, and 100- and 400-pound drums.

Start your winter change-over season with X-18. And you'll learn what "lube" profits really can be. If you would like more detailed information on X-18, send the coupon today.

VALVOLINE OIL CO., General Offices: 540 E. 5th St., Cincinnati, Ohio • Refinery in Pennsylvania



VALVOLINE X-18

replaces winter and summer grades Gear Oils, light and heavy duty; Hypoid, Extreme Pressure, Straight Gear, Worm and Steering Gear Lubricants.

Valvoline Oil Company
540 E. 5th Street, Cincinnati, Ohio

Gentlemen: Without obligation I'd like the facts on "X-18," the new all-season, all-purpose gear lube.

Name.....

Address.....

City.....State.....

Cooperative Advertising Builds Business

Neighborhood Directory Boosts Customers in Community

"Being a community or strictly neighborhood service business," says Wm. P. Hamm in Washington, D. C., "our problem was one of becoming better known in the neighborhood and so increasing our sales volume. Getting your name before the public and keeping it there constantly is the function of advertising. But to use the newspapers is expensive coverage when you only want to contact your immediate neighbors.

"We have tried door to door cir-

culars and blotters, all without any outstanding result, and in which the cost exceeded or equalled the profit on the business obtained. And while every business expects to advertise and absorb the cost in increased volume the smaller business man cannot stand the continuous expense. He must reach all his neighbors quickly when he opens up and make them conscious of his presence.

"We were thinking about advertising in the telephone directory, but we

finally figured that the cost of advertising would be expensive, and might lead to many calls outside of our neighborhood. Furthermore, the people we wanted to cover were out in this section of town, and we wanted to cover the community better, that is, blanket the neighborhood.

"We thought that this could be better accomplished by direct advertising, rather than advertising with everybody else, in the newspapers or telephone directory. So we hit upon the idea of getting six or more merchants in different lines of business to join up with us in a cooperative advertising campaign, which would cut the cost and produce the same result in the end.

"So we got up our own neighborhood telephone directory for ready reference, to insert in the phone book, a stiff piece of cardboard printed on yellow stock, 9 in. by 11 in. with a hole in the top center to hang up in the kitchen or elsewhere about the house, if desired. It was printed at the top "Your Neighborhood PHONE DIRECTORY For Ready Reference—Insert in Phone Book."

"This idea proved very economical. We distributed about 5000 of them from door to door all around the neighborhood for blocks at a total cost of only \$7 each. And we have traced considerable new business and many service calls to this idea.

"When we have gone out on a job or into homes we have found many of these telephone directories hanging up in the kitchen, or else they insert them right in the front sheet of the telephone book. We put them out each time a new telephone directory is issued and take them around from house to house and distribute them with the words, "Here is your latest neighborhood telephone directory. You will find the fire and police numbers in red, or if you need a doctor in a hurry here are the numbers."

"By getting up a neighborhood telephone directory, it is not difficult to get other merchants in other lines to contribute their advertising and to share the expense. Another thing we did was to canvas the entire neighborhood thoroughly and to list everybody in the vicinity alphabetically covering bakeries, banks, beauty shops, beer, cleaners and dyers, dentists, druggists, electric appliances, FIRE CALL in red ink, grocery stores, hardware and paints, ice cream, laundries, liquors, oysters, physicians, POLICE CALL IN RED, plumbers, printers, radios and service, restaurants, shoe repairs, tailors, theaters, vacuum cleaners, washing machines, wines, with a space at the bottom for "Other Important Numbers."

"Most of these listings did not pay anything for this service but we figured it was worth giving 'something to a man for nothing' so that we would have a complete directory of the neighborhood. And at the same time make it a real neighborhood telephone directory instead of just another advertising circular.

"Of course, the same idea can be effectively applied in any other section of the city (or in any city) where stores have grown up to serve the community, and where the neighborhood shops at these stores. If each store did this separately the value

(Continued on page 59)

AJAX



4 TONS OF HYDRAULIC POWER

... and what a price!

● Here is the outstanding hydraulic service jack value of the year. The four-ton Ajax No. 2380 at \$49.85. Full 24" top height. Two pumps ... one for speed and one for power. Rugged malleable side plates and completely enclosed hydraulic housing ... Easy to operate—safe and dependable under all conditions—this jack gives you more than your money's worth! Ask your jobber about Ajax.

AJAX AUTO PARTS CO., RACINE, WISCONSIN

No. 2380
4 TON HYDRAULIC
\$49.85
OTHER AJAX VALUES
No. 2365
2 TON HYDRAULIC SERVICE
\$43.50
No. 2360
2 TON HYDRAULIC
QUICK SERVICE
\$33.00

Eastern U. S. Dealer Prices. Slightly higher west of Rockies and in Canada.

A JACK FOR EVERY AUTOMOTIVE NEED

Louis Unser Retains Pike's Peak Crown

Louis Unser continues to reign as king of treacherous Pike's Peak as a result of the annual Labor Day race up the snow-capped mountain at Colorado Springs, Colo. Unser, winner last year, drove a Miller Special.

The 10 cars finished in this order:

Pos.	Driver	Car
1	Louis Unser	Miller Special
2	Al Rogers	Coniff Special
3	Joe Thorne	Riverside Special
4	Buster Hammond	Woestman Spec.
5	John Mauro	Riverside Special
6	Phil Shafer	Shafer Special
7	James Hammond	Hammond Spec.
8	Glen Harrison	Harrison Special
9	Wayne Danke	Laycock Special
10	George Hammond	Woestman Spec.

Shop Talk

(Continued from page 9)

"Every dealer and service man, jobber and manufacturer," *Collier's* points out, "has hoped for the time when some independent, authoritative source would tell the motorists of America the general automotive story." Well, here it is. The movement has started with the appearance of the first advertisement in the Nov. 4 issue of *Collier's*. To keep the readers of *MOTOR AGE* informed as to the progress of the campaign and the things that are emphasized in it, from month to month, similar advertisements will be published in *MOTOR AGE* by the sponsors of "Preventive Service."

Fruit growers can say to the general public "Eat More Oranges," but each fruit dealer must do something about it by and for himself if his cash drawer is to be filled and his counters emptied. So will it be with "Preventive Service." *MOTOR AGE* urges its readers to cash in.

Portable Pneumatic Grinder

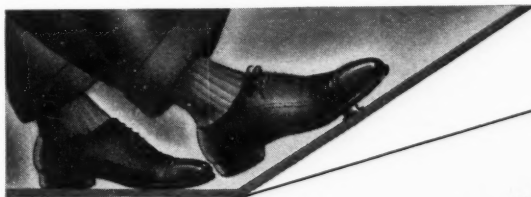
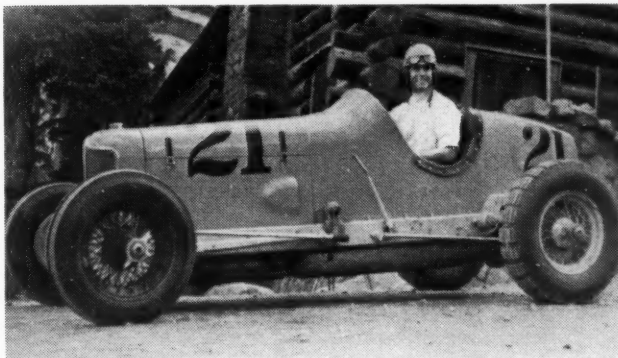
A new rotary air grinder for small-wheel work, known as the Thor "Bantam" has just been announced by the Independent Pneumatic Tool Co., 600 West Jackson Blvd., Chicago, Ill. The tool is 5½ in. long and weighs only 18 ounces. This small size and light weight make it exceptionally easy to handle for even the most delicate precision work. The "Bantam" is suitable for use with a wide variety of accessories, such as rotary files and steel cutters, sanding disks, wire brushes, saw blades and buffing and polishing wheels.

K-D Heater Switches

K-D Lamp Co., 610 W. Court St., Cincinnati, Ohio, has announced a new line of deluxe type illuminated heater switches. They are the variable speed type, and are attached to the instrument panel with a 1 in. clamp which holds them firmly in place. All switches are finished in neutral colors so as to harmonize with the modern instrument panel.

CLIMBER

Louis Unser, winner for the fifth consecutive time of the annual Pike's Peak Race. He is shown here in his Perfect Circle equipped Miller Special in which he set a new record of 15 minutes, 39.2 seconds for the 14,000 ft. climb.



**SELL...
QUICKER STARTING
MAKE BIGGER PROFITS
WITH GENUINE
NIEHOFF Coils**

**BACKED BY OVER
20 YEARS
OF CAR OWNER
ACCEPTANCE**

You can take the grief out of Cold Weather starting and service by featuring and installing NIEHOFF Quality Coils. They restore new car performance with minimum battery drain and provide remarkable reserve power to handle radio, heater and other accessories.

Thousands of NIEHOFF COILS now in use assure you of a steady demand—a quick turnover and a substantial profit. In addition, every customer is a prospect. Leading Jobbers everywhere have a complete stock for immediate delivery. If your Jobber can't supply you write us direct.

FREE "CONTACT", an interesting booklet "chock" full of important technical data and sales information, will be sent to you by request. Attach coupon below to your letterhead and mail TODAY.



**C. E. NIEHOFF & CO.,
4919 Lawrence Ave., Chicago, Ill.**

Please send me my copy of "CONTACT", also complete information on your Quality Coils.

NAME
ADDRESS
CITY STATE



Branch Office
1342 S. Flower
St., Los Angeles, Cal.

PARTS NUMBERS AND PRICES

Ford Model 91 A Std. & De L.—85 Hp.—V-8—1939

FRONT AXLE			
Part No.	No. Used	Price	
78-3010A—Center	1	\$6.00	
78-3106—Knuckle & arm, L.	1	8.35	
78-3105—Knuckle & arm, R.	1	7.75	
78-3115A—King pin	2	.55	
78-3110—King pin bushing	4	.12	
B-3123A—Pin thrust brg.	2	.25	
B-3122—King pin lock pin	2	.12	
78-3111—King pin kit	1	2.15	
78-3283—Tie rod	1	1.30	
78-3290—End assem., L.	1	.95	
78-3289—End assem., R.	1	.95	
78-3405—Radius rod	1	11.25	
B-3446—Radius rod bushing	1	.10	
B-3440—Radius rod caps	1	.18	
78-3032—Radius rod bolt	2	.90	
68-1015A—Front wheel	2	4.50	
78-1105D—Front hub & drum	2	7.50	
B-1201—Wheel brg. cone in.	2	1.00	
B-1202—Wheel brg. cup in.	2	.40	
B-1216—Wheel brg. cone out.	2	.65	
B-1217—Wheel brg. cup out.	2	.30	
48-1190A—Grease retainer	2	.20	

STEERING			
78-3306A—Drag link only	1	2.00	
78-3290—End assembly	1	.95	
78-3590—Pitman arm	1	.85	
78-3575—Cross shaft	1	3.65	
78-3576—Cross shaft bush.	2	.06	
78-3548—Gear housing	1	2.75	
81A-3524—Tube and worm.	1	3.00	
B-3552—Worm brg. cup up.	1	.25	
68-3571A—Worm brg. cone.	2	.25	
78-3553—Worm brg. cup low.	1	.35	
81A-3509—Jacket tube	1	1.10	
40-3517A—Jacket tube bush.	1	.12	
81A-3600A—Steering wheel	1	3.50	
91A-3600—Steering whl. Del.	1	7.25	

COOLING			
*81A-8005B—Rad. core	1	26.50	
*91A-8005—Rad. core assem.	1	29.00	
*91A-8200B—Radiator shell	1	15.25	
*91A-8205A—Rad. shell, L.	1	3.50	
*91A-10883B—Temp. gauge	1	1.75	
78-8575B—Thermostat	2	1.25	
78-8502—Water pump, L.	1	3.45	
78-8504—Pump body L.	1	3.45	
78-8511—Water pump shaft.	2	.30	
78-8512—Pump impeller	2	.40	
78-8520—Shaft bushing	2	.20	
68-8572—Pump seal ring	2	.02	
68-8524—Pump seal	2	.07	
18-8554—Pump washer	2	.02	
68-8560—Pump spring	2	.03	
68-8573—Spring guide	2	.04	
*78-8600—Fan assembly	1	1.05	
*91A-8600—Fan assembly	1	3.55	
*78-8620A—Fan belt	1	1.00	
*78-8620B—Pump & gen. belt	1	P.O.A.	

FUEL AND EXHAUST SYSTEMS			
91A-9510A—Carb. assem.	1	8.00	
91A-9280—Gas gauge (dash)	1	.75	
78-9275—Gas gauge (tank)	1	1.60	
81A-9002—Gas tank	1	9.25	
18-9288A—Flexible gas line	1	.30	
68-9350—Fuel pump	1	5.00	
40-9380—Fuel pump arm spg.	1	.03	
68-18373—Pump repair kit.	1	.90	
78-6520—Inlet manifold & valve cover	1	9.00	
78-9431—Exh. manifold, L.	1	1.70	
91A-5230—Muffler	1	2.50	
91A-5255—Tail pipe	1	1.30	
*78-5245—Exh. pipe, long	1	2.15	
*91A-5245—Exh. pipe, long.	1	2.10	
78-5267—Exhaust pipe	1	1.00	

ENGINE GASKETS			
40-9447B—Carb. to mani.	1	.03	
48-9374—Fuel pump adapter.	1	.01	
40-6521—Inl. mani. & cover.	1	.35	
18-18511—Manifold & exh. pipe flange set.	1	.18	
91A-6051—Cylinder head	2	.40	
48-18512—Oil pan set	1	.30	
78-6335—Main brg. seal, up.	1	.22	
78-6336—Main brg. seal, low.	1	.22	
18-6020—Timing case cover.	1	.01	
78-8507—Water pump to cyl.	2	.04	

ENGINE PARTS			
81A-6011—Block with pistons, pins and rings	1	P.O.A.	
81A-6012—Cyl. assem., exch.	1	50.00	
81A-6050A—Cyl. head L.	1	6.50	
81A-6050B—Cyl. head L. (Al.)	1	18.50	
81A-6010B—Cyl. block only	1	47.50	
48-6675—Oil pan	1	7.75	
91A-6303A—Crankshaft	1	23.75	
48-6251A—Camshaft & gear.	1	6.00	
48-6375—Flywheel	1	7.00	
B-6384—Flywheel gear	1	1.20	
81A-6110C—Piston (Al.) .005"	8	1.60	
91A-6110A—Piston (Steel)	8	1.35	
81A-6149A—Ring set (Al.)	1	4.25	

ENGINE PARTS—continued			
81A-6149G—Ring set (steel)	1	\$4.25	
48-6135A—Piston pin (Steel)	8	.30	
78-6140—Piston pin retainer.	16	.02	
91A-6200—Connecting rod	8	2.40	
81A-6211A—Con. rod brg.	8	1.00	
40-6505B—Inl. & exh. valve.	16	.50	
78-6513—Valve spring	16	.15	
40-6514B—Spring seat	16	.03	
40-6510A—Valve guide (pr.)	16	.30	
40-6512—Valve guide ret.	16	.02	
18-6500A—Valve lifter	16	.30	
48-6306—Crankshaft gear	1	.90	
48-6251A—Camshaft & gear.	1	6.00	

MAIN BEARINGS			
81A-6333A—Front & center.	4	.40	
81A-6331A—Rear	2	.90	

ENGINE OILING			
68-6600—Oil pump assem.	1	5.30	
68-6603—Oil pump body	1	2.95	
18-6608B—Shaft & gear	1	.65	
18-6652—Pump drive gear	1	.35	
18-6610—Pump idler gear	1	.25	
18-6254—Pump drive gear on camshaft	1	.25	
18-6655A—Camsh. idler gear	1	.70	
68-6663—Relief valve plunger	1	.02	
18-6654C—Relief valve spring	1	.03	

CLUTCH			
48-7562—Release brg. spring.	1	.03	
78-7580—Release bearing	1	1.60	
91A-7550—Disc & facing	1	3.60	
48-7563—Press plate & cover	1	4.75	
48-7017—Spline shaft	1	3.80	
B-7600A—Pilot bearing	1	1.25	
B-7025—Spline shaft brg. R.	1	2.75	
78-7052—Brg. retainer seal	1	.35	

TRANSMISSION			
78-7005—Case	1	8.75	
B-7111—Countershaft	1	.50	
B-7118A—CS. brg., short	1	.35	
B-7121A—CS. brg., long	1	.45	
68-7113—CS. gear cluster	1	5.75	
68-7061B—Mainshaft	1	3.45	
B-7118A—Mnshft. pilot brg.	1	.35	
B-7065—Mnshft. brg. R.	1	2.75	
68-7100B—Low sliding gear.	1	2.00	
B-7103—Second speed gear.	1	2.50	
68-7104—Sec. speed sleeve	1	.50	
68-7141—Reverse idler gear.	1	1.75	
48-7106—Synch. hub sleeve.	1	1.60	
B-7108—Synch. hub & ring.	1	1.85	
B-7109—Hub spring	6	.02	
81A-7204B—Cover assembly	1	2.50	
40-7207—Cover cap gasket.	1	.02	
81A-7210—Shift lever	1	1.75	
B-7227—Shift lever spring	1	.02	
81A-7240—Shift bar, low	1	.55	
81A-7241—Shift bar, 2nd.	1	.55	
68-7231—Shift fork low	1	1.35	
68-7230—Shift fork 2nd	1	1.35	

UNIVERSALS			
B-7090—Joint assembly	1	3.00	
B-4515—Joint gasket	2	.02	
B-7084—Spider assembly	1	1.20	
B-7096—Bush. lock ring	4	.01	
68-4605B—Propeller shaft	1	7.90	
B-4645A—Shaft front brg.	1	.55	
B-4245—Shaft grease ret.	1	.25	

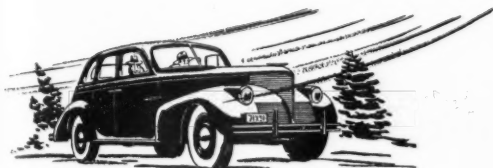
REAR AXLE			
68-4011—Housing L.	1	10.25	
48-4025—Housing Cen.	1	5.25	
18-4035A—Housing gasket	2	.03	
18-4205—Differential case, L.	1	1.95	
18-4211—Differential cross	1	1.70	
81A-4215—Differential pinion	4	.80	
68-4209A—Pin. & ring gear.	1	14.75	
48-4621—Pinion cone	1	1.50	
48-4616—Pinion cup	1	1.95	
18-4625A—Pin. outboard brg.	1	.90	
68-4221—Diff. cone	2	1.40	
68-4222—Diff. cup	2	.75	
B-4245—Grease retainer in.	2	.25	
78-1175—Grease retainer out.	2	.40	
81A-4235—Axle shaft	2	3.30	
68-1225—Axle shaft bearing.	2	.65	
78-1115C—Rear hub & drum.	2	7.75	
68-4504—Torque tube	1	13.75	
68-4751—Radius rod, L.	1	2.60	

FRONT SPRINGS			
78-5310C—Assem. (11 leaf)	1	5.75	
48-5464A—Shackle stud	4	.25	
91A-5459—Shackle bar	4	.06	
74-5455A—Spring clip	2	.25	

REAR SPRINGS			
78-5560A—Assem. (10 leaf)	1	6.25	
78-5560B—Assem. (11 leaf)	1	6.75	
40-5715A—Shackle stud	4	.25	
91A-5468—Shackle bar	4	.06	
B-5705A—Spring clip	2	.20	

ELECTRICAL SYSTEM			
Part No.	No. Used	Price	
78-12127—Distributor, exch.	1	\$2.25	
68-12116—Dist. term. plate.	2	.45	
68-12162—Contact arm	1	.25	
68-12218—Contact point, R.	1	.25	
68-12219—Contact point, L.	1	.25	
78-12300—Condenser	1	.35	
78-12024A—Ignition coil	1	3.55	
81A-3676—Ign. & steer. lock.	1	2.50	
*91A-11653—Lighting switch	1	4.50	
78-11450—Starter solenoid	1	1.35	
91A-11500—Starter button	1	.30	
91A-13480—Stop light switch	1	.40	
*91A-10850—Ammeter	1	.55	
*91A-10844—Bat. indicator.	1	.75	
*81A-10000—Gen. assem.	1	15.50	
*91A-10000—Gen. assem.	1	13.25	
40-10069—Generator brush	2	.10	
40-10070—Gen. 3rd brush	1	.05	
78-10005A—Gen. arm. exch.	1	4.15	
79-10094—Drive end brg.	1	1.75	
81A-10175—Gen. field coil set	1	2.20	
B-10505—Cutout relay	1	.95	
18-11002—Starter assem.	1	10.00	
18-11057—Starter brush set.	1	.50	
18-11005—Starter armature	1	3.50	
18-11083—Field coil, L.	1	.65	
B-11350—Starter drive	1	4.25	
B-11375—Starter spring	1	.60	
*81A-13005—Hdlamp assem.	2	4.00	
*91A-13005—Hdlamp assem.	2	4.25	
78-13028—Hdlamp reflector	2	.40	
*81A-13060—Hdlamp lens	2	.45	
*91A-13060—Hdlamp lens.	2	.50	
81A-13405—Rear lamp L.	1	1.40	
91A-13550—License lamp	1	1.90	
*91A-14300—Bat. switch cable	1	.55	
91A-14301—Bat. ground cable	1	.30	

FRAME and BODY			
(4 door sedans in prime)			
De Luxe Model—For Standard Sedans see Model 922A			
91A-16006—Front fender L.	1	13.75	
81A-16313C—Rear fender L.	1	9.25	
91A-16612B—Hood assem.	1	26.00	
91A-7001610B—Dash panel	1	2.95	
91A-7004320C—Inst. panel	1	6.90	
91A-7002055B—Cowl panel L.	1	3.55	
91A-7002330—Cowl vent. seal	1	.25	
78-701250—Windshield glass.	2	5.00	
78-701290—Windshield seal	2	1.10	
91A-7003310—Windshld. reglt.	2	1.20	
91A-732015—Door assem. LF	1	54.00	
91A-7320123—Door, bar LF.	1	14.00	
81A-733100B—Door pillar, C.	2	2.80	
81A-732340—Door striker	4	.25	
48-702550—Dovetail, male	4	.15	
78-702570—Dovetail, female	4	.20	
78-702610—Door bumper	8	.03	
78-732160A—Door glass, F.	2	5.45	
78-702701A—Glass regltr. LF	1	1.85	
81A-732413—Remote cntrl LF	1	.35	
81A-702251—Door lock, LF.	1	...	
91A-7322400—Door handle	4	.75	
91A-7022600B—Dr. handle in.	4	.30	
L78-702242—Glass run, LF.	1	.45	
81A-732651—Door sill, LF.	1	1.00	
91A-7327817—Quarter panel L	1	12.00	
81A-704210—R. window glass	2	2.75	
81A-704220—R. glass seal	2	.45	
91A-7050200—Roof panel	1	24.75	
91A-7040110—Luggage lid	1	8.00	
91A-7043720—Lid seal	1	1.05	
91A-7043500—Lid handle	1	1.50	



WINTER'S ICY BLASTS BRING TWO BLASTS FROM CHAMPION TO MAKE EXTRA PROFITS FOR YOU

Wide-awake dealers are finding the coming of winter the best season for making extra sales and profits. Among the most needed and profitable items are new spark plugs.

Champion national advertising in October and November will remind your customers that hard starting, run down batteries, poor gas mileage and other *bugaboos* due to the rigors of winter can be, to a great extent, avoided by installing a new set of Champion Spark Plugs.

"Red Flannel" posters are available from your jobber or our sales force and will effectively tie you into this winter campaign. Be sure your tester and cleaner are in a prominent position. If you have no tester or cleaner, remember that the new Champion Super Sales Service Unit is the only complete spark plug department in one compact portable unit, and costs only \$18.00.

Important. Place your order for *dependable Champion Spark Plugs* with your jobber now. Don't miss sales because of inadequate stock or inability to sell complete sets.

CHECK AND CLEAN SPARK PLUGS WHEN YOU CHANGE OIL

MOTOR AGE, October, 1939

When writing to advertisers please mention Motor Age

Mechanical Specifications

These Specifications Are Brought Up-to-Date Each Month by the

Line Number	MAKE AND MODEL	Lowest Priced 4-D. Sed. (Divd.)	Wheelbas. (In.)	Tire Size (In.)	No. of Cylinders, Bore and Stroke	ENGINE														CHASSIS							
						Taxable Hp.	Piston Displacement (Cu. In.)	Maximum Brake HP. at Specified R.P.M.	Compression Ratio (to -1.)	Displacement Factor	Cylinder Head Material	Camshaft Drive Make	Piston Material	Oil Cleaner Make	Air Cleaner Make	Carburetor Make	Muffler Make	Electrical System Make	Battery Make	Clutch	Gearset Make	Universals Type and Make	Rear Axle Type and Make	Rear Axle Ratio	Front Spring Suspension		
1	Bantam.....65	399*	75	4.00/15	4-2.26x3.12	8.17	50.1	22-3800	7.40	.....	CI	Own	Als	No	AC	Zen	McK	AL	AL	P.Ro	WG	m-UP	½ Spi	5.25	Tr	
2	Buick.....40-40		121	6.50/16	8-3 ¾x4 ¼	30.6	248.0	107-3400	6.10	.....	CI	LB	Ala	AC	AC	Str	Hay	DR	Del	P.Own	Own	Mp-Spi	1 ½ Own	4.40	IC	
3	Buick.....40-50		121	6.50/16	8-3 ¾x4 ¼	30.6	248.0	107-3400	6.10	.....	CI	LB	Ala	AC	AC	Str	Hay	DR	Del	P.Own	Own	Mp-Spi	1 ½ Own	4.40	IC	
4	Buick.....40-60		126	7.00/15	8-3 ¾x4 ¼	37.8	320.2	141-3600	6.25	.....	CI	LB	Ala	AC	AC	Str	Hay	DR	Del	P.Own	Own	Mp-Spi	1 ½ Own	3.90	IC	
5	Buick.....40-70		126	7.00/15	8-3 ¾x4 ¼	37.8	320.2	141-3600	6.25	.....	CI	LB	Ala	AC	AC	Str	Hay	DR	Del	P.Own	Own	Mp-Spi	1 ½ Own	3.90	IC	
6	Buick.....40-80		133	7.50/16	8-3 ¾x4 ¼	37.8	320.2	141-3600	6.25	.....	CI	LB	Ala	AC	AC	Str	Hay	DR	Del	P.Own	Own	Mp-Spi	1 ½ Own	4.18	IC	
7	Buick.....40-90		140	7.50/16	8-3 ¾x4 ¼	37.8	320.2	141-3600	6.25	.....	CI	LB	Ala	AC	AC	Str	Hay	DR	Del	P.Own	Own	Mp-Spi	1 ½ Own	4.55	IC	
8	Cadillac V8-39-61-60S	1680	126-127	7.00/16	8-3 ½x4 ½	39.2	346.0	135-3400	6.25	44.5	CI	Mor	Ala	No	AC	Str	Wal	DR	Del	P.Long	Own	Nb-Mec	1 ½ Own	3.92	IC		
9	Cadillac.....V8-39-75	2995	141	7.50/16	8-3 ½x4 ½	39.2	346.0	140-3400	6.70	40.1	CI	Mor	Ala	No	AC	Str	Wal	DR	Del	P.Long	Own	Nb-Mec	1 ½ Own	4.58	IC		
10	Cadillac-V-16...39-90	5140	141	7.50/16	16-3 ¼x3 ¼	67.6	431.0	185-3600	6.75	44.3	CI	Mor	Ala	AC	AC	Car	Wal	DR	Del	P.Long	Own	Nb-Mec	1 ½ Own	4.31	IC		
11	Chevrolet Mas. 39-85	689	112 ¼	6.00/16	6-3 ½x3 ¾	29.4	216.5	85-3200	6.25	35.2	CI	Own	CI	No	AC	Car	Var	DR	Del	P.Own	Own	p-Own	1 ½ Own	3.73	C		
12	Chevrolet.....MDL-39	720	112 ¼	6.00/16	6-3 ½x3 ¾	29.4	216.5	85-3200	6.25	39.2	CI	Own	CI	No	AC	Car	Var	DR	Del	P.Own	Own	p-Own	1 ½ Own	4.22	IC		
13	Chrysler.....C-25		122 ½	6.25/16	6-3 ¾x4 ½	27.3	241.5	108-3600	6.50	.....	CI°	Mor	Al	.....	AC	Car	.....	AL	Wil	P.B&B	Own	Cb	1 ½ Own	4.10	IC
14	Chrysler.....C-26		128 ½	7.00/15	8-3 ¾x4 ½	33.8	323.5	135-3400	6.80	.....	CI°	.....	Al	.....	AC	Str	.....	AL	Wil	P.B&B	.....	Cb	1 ½ Own	3.91	IC
15	Chrysler.....C-27		145 ½	7.50/15	8-3 ¾x4 ½	33.8	323.5	137-3400	6.80	.....	Al	.....	Al	.....	AC	Str	.....	AL	Wil	P.B&B	.....	Cb	1 ½ Own	4.55	IC
16	Crosley.....A		80	4.25/12	2-3x2 ¼	7.2	38.9	15-4200	5.50	.....	CI	For	CI	No	AC	Til	Rex	AL	AL	P.Ro	WG	-Spi	1 ½ Spi	5.14	C	
17	De Soto.....S-7		122 ½	6.00/16	6-3 ¾x4 ½	27.3	228.1	100-3600	6.50	.....	CI°	.....	Al	.....	AC	Car	.....	AL	Wil	P.B&B	Own	Cb	1 ½ Own	4.10	IC
18	Dodge.....D-14-17		119 ½	6.00/16	6-3 ¼x4 ¾	25.3	217.8	87-3600	6.50	.....	CI	.....	Als	.....	AC	Str	.....	AL	AL	P.B&B	Own	Nb	1 ½ Own	4.10	IC
19	Ford V8-60.....1940		112	5.50/16	8-2.6x3.2	21.6	136.0	60-3500	6.60	30.7	Al	.....	CS	No	Yes	Str	Own	O	Own	P.Os	Own	m-Spi	¾ Own	4.44	Tr	
20	Ford V8-85.....1940		112	6.00/16	8-3 ⅛x3 ¾	30.0	221.0	85-3800	6.15	38.2	CI	.....	CS	No	Yes	Str	Own	O	Own	P.Os	Own	m-Spi	¾ Own	3.78	Tr	
21	Graham.....39-96		120	6.00/16	6-3 ½x4 ¾	25.3	217.8	90-3600	6.50	36.8	CI	LB	Als	No	AC	Mar	Old	DR	Wil	P.Long	WG	Nb-UP	1 ½ Spi	4.27	C		
22	Graham.....39-97		120	6.25/16	6-3 ½x4 ¾	25.3	217.8	116-4000	6.70	.....	Al	LB	Als	No	AC	Mar	Old	DR	Wil	P.Long	WG	Nb-UP	1 ½ Spi	4.27	C	
23	Hudson.....Six		113	5.50/16	6-3x4 ½	21.6	175.0	92-4000	7.00	.....	CI	Ge	Als	No	AC	Car	Old	AL	Nat	P.Own	Own	Nb-Spi	1 ½ Own	4.55	IC	
24	Hudson Sup. & CC. 6		118-125	6.00/16	6-3x5	21.6	212.0	102-4000	6.50	.....	CI	Ge	Als	No	AC	Car	Old	AL	Nat	P.Own	Own	Nb-Spi	1 ½ Own	4.11	IC	
25	Hudson.....8 & CC. 8		118-125	6.00/16	6-3x4 ½	28.8	254.0	128-4200	6.50	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
26	La Salle...V8, 39-50	1320	120	7.00/16	8-3 ¾x4 ¾	36.4	322.0	125-3400	6.25	41.7	CI	Mor	Ala	No	AC	Car	Wal	DR	Del	P.Long	Own	Nb-Mec	1 ½ Own	3.92	IC		
27	Lincoln-V12.....		136-145	7.50/17	12-3 ⅛x4 ¼	46.8	414.0	150-3400	6.38	.....	Al	Mor	Al	Pur	AC	Str	Old	AL	Exi	P.Long	Own	m-Spi	FF Tim	4.58	C	
28	Lincoln-Zephyr...1940		125	7.00/16	12-2 ⅞x3 ¾	39.6	292.0	120-3900	6.70	.....	Al	Dia	CS	.....	AC	Str	Old	O	Own	P.Os	Own	m-Spi	¾ Own	4.44	Tr
29	Mercury.....1940		116	6.00/16	8-3.187x3 ½	32.5	239.0	95-3600	6.15	.....	CI	Dia	CS	.....	AC	Str	Own	O	Own	P.Os	Own	m-Spi	¾ Own	3.54	Tr
30	Nash-Lafay....4010		117	6.00/16	6-3 ¾x4 ¾	27.3	234.8	99-3400	6.30	.....	CI	Whit	Als	No	AC	Car	Wal	AL	USL	P.B&B	Own	Nb-Mec	1 ½ Own	4.10	IC	
31	Nash...Amb. 6, 4020		121	6.25/16	6-3 ¾x4 ¾	27.3	234.8	105-3400	6.00	.....	CI	Whit	Als	BS	AC	Car	Wal	AL	USL	P.B&B	Own	Nb-Mec	1 ½ Own	4.10	IC	
32	Nash...Amb. 8, 4080		125	7.00/15	8-3 ¾x4 ¼	31.2	260.8	115-3400	6.00	.....	CI	Dia	Als	BS	AC	Car	Wal	AL	USL	P.B&B	Own	Nb-Mec	1 ½ Own	4.10	C	
33	Oldsmobile...39-60	889	115	6.00/16	6-3 ⅞x3 ¾	28.4	216.0	90-3200	6.20	39.3	CI	Whit	Ala	No	AC	Car	Var	DR	Del	P.B&B	Own	Rb-Mec	1 ½ Own	4.30	IC		
34	Oldsmobile...39-70	952	120	6.00/16	6-3 ⅞x4 ½	28.4	229.7	95-3300	6.10	39.7	CI	Whit	Ala	No	AC	Car	Var	DR	Del	P.B&B	Own	Rb-Mec	1 ½ Own	4.30	IC		
35	Oldsmobile...39-80	1043	120	6.50/16	8-3 ¼x3 ¾	33.8	257.1	110-3500	6.20	41.6	CI	LB	Ala	No	AC	Car	Var	DR	Del	P.B&B	Own	Rb-Mec	1 ½ Own	4.30	IC		
36	Packard One Ten.....	122	122	6.25/16	6-3 ¾x4 ¼	29.4	245.0	100-3200	6.39	.....	CI	Mor	Als	No	AC	Str	.....	AL	PO	.....	.....	Rb-Mec	1 ½ Own	4.30	.....	
37	Packard One Twenty.....	127	127	6.50/16	8-3 ¾x4 ¼	33.8	282.0	120-3600	6.41	.....	CI	Mor	Als	No	AC	Str	.....	AL	Wil	.....	.....	Rb-Mec	1 ½ Own	4.09	.....	
38	Packard One Sixty.....	127-38-48	127-38-48	7.00/16	8-3 ¾x4 ¾	39.2	356.0	160-3500	6.45	.....	CI	Mor	Als	.....	AC	Str	.....	AL	Wil	.....	.....	Rb-Mec	1 ½ Own	3.92	.....	
39	Plymouth.....P7	726	117 ½	5.50/16	6-3 ¾x4 ¾	23.4	201.3	84-3600	6.70	.....	CI°	Mor	Al	Yes	Al	Car	.....	AL	AL	P.B&B	Own	Nb-UP	1 ½ Own	3.90	IC
40	Plymouth.....P8	791	117 ½	6.00/16	6-3 ¾x4 ¾	23.4	201.3	84-3600	6.70	.....	CI°	Mor	Al	Yes	Al	Car	.....	AL	AL	P.B&B	Own	Nb-UP	1 ½ Own	4.10	IC
41	Pontiac 6.....40-25		117	6.00/16	6-3 ⅞x4	28.3	222.7	87-3520	6.50	.....	CI	Mor	CNI	No	AC	Car	Var	DR	Del	P.In	Own	Rb-Mec	1 ½ Own	4.30	IC	
42	Pontiac 6.....40-26		120	6.00/16	6-3 ⅞x4	28.3	222.7	87-3520	6.50	.....	CI	Mor	CNI	No	AC	Car	Var	DR	Del	P.In	Own	Rb-Mec	1 ½ Own	4.30	IC	
43	Pontiac 8.....40-28		120	6.50/16	8-3 ¾x3 ¾	33.8	248.9	100-3700	6.50	.....	CI	Mor	CNI	No	AC	Car	Var	DR	Del	P.In	Own	Rb-Mec	1 ½ Own	4.30	IC	
44	Pontiac 8.....40-29		121 ½	6.50/16	8-3 ¾x3 ¾	33.8	248.9	100-3700	6.50	.....	CI	Mor	CNI	No	AC	Car	Var	DR	Del	P.In	Own	Rb-Mec	1 ½ Own	4.30	IC	
45	Studebaker Champ.....			5.50/16	6-3x3 ¾	21.6	164.3	78-4000	6.50	.....	CI	Dia	Ly	No	AC	Car	Wal	AL	Wil	P.B&B	WG	m-Spi	1 ½ Spi	4.56	IT	
46	Studebaker Com.10A			6.25/16	6-3 ¾x4 ¾	26.3	226.0	90-3400	6.00	.....	CI	Dia	Ly	No	AC	Str	Old	AL	Wil	P.B&B	WG	Nb-Spi	1 ½ Spi	4.55	IT	
47	Studebaker Pres.6C			6.50/16	8-3 ⅞x4 ¼	30.0	250.4	110-3600	6.00	CI	Dia	Dia	Ly	Fram	Fram	AC	Str	Old	DR	Wil	P.In	WG	Nb-Spi	1 ½ Spi	4.55	IT
48	Willys.....440		102	5.50/16	4-3 ⅞x4 ¾	15.6	134.2	61-3600	6.48	.....	CI°	LB	Al	.....	AC	Car	McK	AL	Nat	P.R-B	WG	m-UP	1 ½ Own	4.55	C

ABBREVIATIONS-General

°-Others also

*-Measured on rim of Flywheel

(1)-22 on Ford V8, 21 on DeL. Ford V8.

1/2-Semi-floating

3/4-Three-quarter floating

††-With clearance of .015 the valve is .004 off its seat.

‡-Does not include Federal Taxes

§-Computed on basis of displacement, gear ratio, effective tire diameter,

and weight with normal load.

A-Above (rods removed from)

AA-After top center

AA-Automatic adjuster

Ad-Advanced Al-Aluminum

Ala-Aluminum, Anode processed

Als-Aluminum with struts

Au-Automatic

(b)-4.36-1701; 4.70-1702

B-Below (rods removed from)

B-Before top center

Bm-Before marks on vibrat'n d'mpr

(c)-1-1/2, 1-3/4 C-Conventional

C-Cold (tappet clearance)

Cb-Cross type with roller bearings

Ch-Chain

CNI-Chrome Nickel Iron

CI-Cast Iron CS-Cast Steel

Tune-Up Specifications

Car Manufacturers and Supersede All Others Previously Published

Service Brake Make and Type			Steering Gear Make Compression Pressure at Cranking Speed (Lbs.)			Spark Plug Make and Type			RINGS		Piston Pin Diameter		Piston Pin Locked In		VALVES										IGNITION										FRONT AXLE										Line Number
									No. and Width Comp.	No. and Width Oil					Head Diameter and Seat Angle			Operating Tappet Clearance		Intake Valve Opens Before or After T. C.		Breaker Points Gap (Ins.)	Timing			Crankpin Diameter (Ins.)	Crankpin Length (Ins.)	Capacity Crankcase (Qts.)	Capacity Cooling System (Qts.)	Caster (Degrees)	Camber (Degrees)	Toe-In (Inches)	King Pin Inclination (Degrees)												
															Inlet (Ins.)	Inlet Seat Angle (Degrees)	Exhaust (Ins.)						Exhaust Seat Angle (Degrees)	Stem Diameter (Ins.)	Inlet									Exhaust	Inlet Tappet Clearance for Valve Timing	No. of Degrees	No. of Flywheel Teeth	Spark Plug Gap (Ins.)	Spark Occurs °TC	No. of Flyw. Teeth Spark Occurs TC	Breaker Housing	Rods Removed From			
OM R	135	Ch-H-10	2-3/32	1-1/8	2-3/32	1-1/8	R	1 1/8	45	1 1/8	45	.279	.011H	.012H	.011	19B022	.025	4BT	Au	A	1 1/4	1	3	5 1/2	15	1 1/4	1 1/8	1 1/2	1													
BH S	112	AC-46	2-3/32	2-1/8	2-3/32	2-1/8	R	1 1/8	45	1 1/8	45	.372	.015H	.015H	++	13B	.....	.015	.025	4B	.....	Au	A	2	1 1/2	8	.....	3/8 ± 3/8	1/4 ± 1/4	3 1/4	2										
BH S	112	AC-46	2-3/32	2-1/8	2-3/32	2-1/8	R	1 1/8	45	1 1/8	45	.372	.015H	.015H	++	13B	.....	.015	.025	4B	.....	Au	A	2	1 1/2	8	.....	3/8 ± 3/8	1/4 ± 1/4	3 1/4	3										
BH S	114	AC-46	2-3/32	2-1/8	2-3/32	2-1/8	R	1 1/8	45	1 1/8	45	.372	.015H	.015H	++	14B	.....	.015	.025	6B	.....	Au	A	2 1/4	1.31	10	.....	3/8 ± 3/8	1/4 ± 1/4	3 1/4	4										
BH S	114	AC-46	2-3/32	2-1/8	2-3/32	2-1/8	R	1 1/8	45	1 1/8	45	.372	.015H	.015H	++	14B	.....	.015	.025	6B	.....	Au	A	2 1/4	1.31	10	.....	3/8 ± 3/8	1/4 ± 1/4	3 1/4	5										
BH S	114	AC-46	2-3/32	2-1/8	2-3/32	2-1/8	R	1 1/8	45	1 1/8	45	.372	.015H	.015H	++	14B	.....	.015	.025	6B	.....	Au	A	2 1/4	1.31	10	.....	3/8 ± 3/8	1/4 ± 1/4	3 1/4	6										
BH S	114	AC-46	2-3/32	2-1/8	2-3/32	2-1/8	R	1 1/8	45	1 1/8	45	.372	.015H	.015H	++	14B	.....	.015	.025	6B	.....	Au	A	2 1/4	1.31	10	.....	3/8 ± 3/8	1/4 ± 1/4	3 1/4	7										
BH S	155x	AC-104	2(c)	2-3/32	2-3/32	2-3/32	F	1.88	45	1.63	45	.341	AA	AA	AA	TC	TC	.015	.027	5B	2 1/4 B	Au	A	2.46	2 1/2	7.25	(nn)	(np)	3 1/2 ± 3/2	(nr)	8														
BH S	170x	AC-104	2(c)	2-3/32	2-3/32	2-3/32	F	1.88	45	1.63	45	.341	AA	AA	AA	TC	TC	.015	.027	5B	2 1/4 B	Au	A	2.46	2 1/2	7.25	0 ± 1/4	0 ± 1/4	5 1/2 ± 1/2	5 1/2 ± 1/2	9														
BH S	180x	AC-104	2(c)	2-3/32	2-3/32	2-3/32	F	1.50	45	1.37	45	.341	AA	AA	AA	6B	.....	.015	.032	6B	2 1/2 B	Au	A	2	1 3/4	11.30	0 ± 1/4	0 ± 1/4	5 1/2 ± 1/2	5 1/2 ± 1/2	10												
OH O	.....	AC-44	2-3/32	1-1/8	2-3/32	1-1/8	R	1 1/4	30	1 1/4	30	.340	.006H	.013H	.006	9B	3 1/2 B	.021	.040	5B	2B	Au	A	2 1/8	1 1/8	5.14	2 1/4 ± 1/4	1 ± 1/2	4 1/4 ± 1/4	7 10' ± 1/2	11													
OH O	.....	AC-44	2-3/32	1-1/8	2-3/32	1-1/8	R	1 1/4	30	1 1/4	30	.340	.006H	.013H	.006	9B	3 1/2 B	.021	.040	5B	2B	Au	A	2 1/8	1 1/8	5.14	0 ± 1/2	N ± 1/2	4 1/4 ± 1/4	4 1/4 ± 1/4	12													
LH G	145x	.....	2-3/32	2-3/32	2-3/32	2-3/32	F	1 1/2	45	1 1/2	45	.340	.008H	.010H	.014	12B	.....	.020	.025	TC	TC	Au	A	2 1/8	1 1/8	5.18	.....	.....	.....	.....	13							
LH G	155x	.....	2-3/32	2-3/32	2-3/32	2-3/32	F	1 1/2	45	1 1/2	45	.340	.008H	.010H	.011	6B	.....	.018	.025	TC	TC	Au	A	2 1/8	1 1/8	6.24	.....	.....	.....	.....	14							
LH G	155x	.....	2-3/32	2-3/32	2-3/32	2-3/32	F	1 1/2	45	1 1/2	45	.340	.008H	.010H	.011	6B	.....	.018	.025	3B	.....	Au	A	2 1/8	1 1/8	6.24	.....	.....	.....	.....	15						
HM R	90	AL-A5	2-3/32	1-3/32	2-3/32	1-3/32	P	1 3/8	45	1 3/8	45	.312	.006C	.007C	.006	20B	.....	.020	.025	3B	.....	A	1 1/2	2 1/2	2	6-11	2	3/4 ± 1/4	6 1/2 ± 1/2	16												
LH G	145x	.....	2-3/32	2-3/32	2-3/32	2-3/32	F	1 1/2	45	1 1/2	45	.340	.008H	.010H	.014	12B	.....	.020	.025	2B	.....	Au	A	2 1/8	1 1/8	5.17	.....	.....	.....	.....	17						
LH G	140x	.....	2-3/32	2-3/32	2-3/32	2-3/32	F	1 1/2	45	1 1/2	45	.340	.008H	.008H	.011	6A	2 1/2 A	.020	.025	TC	TC	Au	A	2 1/8	1	5.15	.....	.....	.....	.....	18									
LH G	150y	Ch-H-10	2-3/32	1-3/32	2-3/32	1-3/32	F	1.28	45	1.28	45	.279	.013C	.013C	.013	9 1/2 B	3 1/2 B	.015	.025	4B	1 1/2 B	Au	A	1.70	1.41	4	4 1/2 ± 1/2	1/4 ± 1/4	1 1/8 ± 1/8	8	19														
LH G	100	Ch-H-10	2-3/32	1-3/32	2-3/32	1-3/32	F	1.35	45	1.35	45	.310	.013C	.013C	.013	TC	TC	.015	.025	4B	1 1/2 B	Au	A	2	1.75	5.22	4 1/2 ± 1/2	1/4 ± 1/4	1 1/8 ± 1/8	8	20														
OH R	120	Ch-H-10	2-3/32	2-3/32	2-3/32	2-3/32	R	1 1/2	30	1 1/2	30	.341	.010H	.010H	.012	4 1/2 B	1 1/2 B	.018	.025	TC	TC	Au	A	2 1/8	1 1/8	5.14	3-4	1	1/8 ± 3/8	7 1/2 ± 1/2	21														
OH R	130	Ch-H-10	2-3/32	2-3/32	2-3/32	2-3/32	R	1 1/2	30	1 1/2	30	.341	.010H	.010H	.012	4 1/2 B	1 1/2 B	.018	.025	4 1/2 A	1 1/2 A	Au	A	2 1/8	1 1/8	5.15	3-4	1	1/8 ± 3/8	7 1/2 ± 1/2	22														
BH G	125	Ch-J-8	2-3/32	2(d)	2-3/32	2(d)	F	1 3/8	45	1 3/8	45	.341	.006H	.008H	.....	10 3/8 B	.....	.020	.032	TC	.....	Au	A	1 1/8	1 3/8	6.13	0 ± 1/4	1/2 ± 1/4	3 1/2 ± 1/2	3 3/8 ± 1/8	23										
BH G	120	Ch-J-8	2-3/32	2(d)	2-3/32	2(d)	F	1 3/8	45	1 3/8	45	.341	.006H	.008H	.....	10 3/8 B	.....	.020	.032	TC	.....	Au	A	1 1/8	1 3/8	6.13	0 ± 1/4	1/2 ± 1/4	3 1/2 ± 1/2	3 3/8 ± 1/8	24										
BH G	119	Ch-J-8	2-3/32	2(d)	2-3/32	2(d)	F	1 3/2	45	1 3/8	45	.343	.006H	.008H	.....	10 3/8 B	.....	.017	.032	TC	.....	Au	A	1 1/8	1 3/8	9.18	0 ± 1/4	1/2 ± 1/4	3 1/2 ± 1/2	3 3/8 ± 1/8	25										
BH S	155x	AC-104	2(c)	2-3/32	2-3/32	2-3/32	F	1.88	45	1.63	45	.341	AA	AA	AA	TC	TC	.015	.027	5B	2 1/4 B	Au	A	2 1/8	2 1/2	7	N 1/4 ± 1/4	0 ± 3/4	1 1/8 ± 1/8	5 1/2 ± 1/2	26														
OM O	105	Ch-7	2-3/32	2-3/32	2-3/32	2-3/32	F	1 1/4	45	1 1/4	45	.311	AA	AA	AA	21B	6 1/2 B	.020	.029	7B	2 1/4 B	Au	B	2 3/8	2	12.32	1 1/2	1	1 1/8 ± 1/8	7 1/2 ± 1/2	27														
BH G	105	Ch-H-10	2-3/32	2-3/32	2-3/32	2-3/32	F	1.53	45	1.53	45	.311	AA	AA	AA	AA	.....	.015	.025	4B	1 1/2 B	Au	A	2 1/8	1.57	5.30	4	1/4	1 1/8 ± 1/8	7 1/2 ± 1/2	28												
BH G	.....	Ch-H-10	2-3/32	1-3/32	2-3/32	1-3/32	F	1 1/2	45	1 1/2	45	.310	.013C	.013C	.013	TC	TC	.015	.025	4B	1 1/2 B	Au	A	2.14	1.75	5.21	4 1/2 ± 1/2	1/4 ± 1/4	1 1/8 ± 1/8	8	29													
BH G	110	AL-B7-A	2-3/32	2-3/32	2-3/32	2-3/32	F	1 1/2	45	1 1/2	45	.340	.015	.015	.015	2 1/2 B	6B	.020	.025	TC	TC	Au	A	2	1.42	6.19	0-N 1/2	1/4 ± 1/4	1 1/8 ± 1/8	4 1/2 ± 1/2	30														
BH G	125	AC-45	2-3/32	2-3/32	2-3/32	2-3/32	F	1 3/4	45	1 1/2	45	.372	.015	.015H	.015	2 1/2 B	7B	.020	.025	6B	1 1/2 B	Au	A	2	1.42	6.16	0-N 1/2	1/4 ± 1/4	1 1/8 ± 1/8	4 1/2 ± 1/2	31														
BH G	110	AC-45	2-3/32	1-1/8	2-3/32	1-1/8	F	1 1/2	45	1 1/2	45	.372	.015H	.015H	.015	20B	6B	.020	.025	9B	3 1/2 B	Au	B	2	1.24	7.17	0-N 1/2	1/4 ± 1/4	1 1/8 ± 1/8	4 1/2 ± 1/2	32														
BH S	151x	AC-45	2-3/32	2-3/32	2-3/32	2-3/32	P	1 1/8	30	1 1/8	30	.311	.008H	.011H	.011	5B	2B	.020	.040	TC	TC	Au	A	2 1/8	1 1/8	5.17	0-N 3/4	1/8 ± 1/8	1 1/8 ± 1/8	4 1/2 ± 1/2	33														
BH S	146x	AC-45	2-3/32	2-3/32	2-3/32	2-3/32	P	1 1/8	30	1 1/8	30	.311	.008H	.011H	.011	5B	2B	.020	.040	TC	TC	Au	A	2 1/8	1 1/8	5.17	0-N 3/4	1/8 ± 1/8	1 1/8 ± 1/8	4 1/2 ± 1/2	34														
BH S	152x	AC-45	2-3/32	2-3/32	2-3/32	2-3/32	P	1 1/8	30	1 1/8	30	.311	.008H	.011H	.011	TC	TC	.015	.030	2B	3 1/2 B	Au	A	2 1/8	1 1/8	6.24	0-N 3/4	1/8 ± 1/8	1 1/8 ± 1/8	4 1/2 ± 1/2	35														
H O	.....	AC-104	2-3/32	1-3/32	2-3/32	1-3/32	F	1 1/2	30	1 1/2	30	.340	.007H	.010H	.012	1B	.....	.020	.028	6B	.....	Au	.....	2 3/8	1 1/4	5.17	1 1/2 ± 1/2	(t)	(e)	1 5/4 ± 1/4	36									
H O	.....	AC-104	2-3/32	1-3/32	2-3/32	1-3/32	F	1 1/2	30	1 1/2	30	.340	.007H	.010H	.012	1B	.....	.015	.028	6B	.....	Au	.....	2 3/8	1 1/4	5.17	1 1/2 ± 1/2	(t)	(e)	1 5/4 ± 1/4	37									
H O	.....	AC-104	2-3/32	1-3/32	2-3/32	1-3/32	F	1 1/2	30	1 1/2	30	.340																																

Studebaker

(Continued from page 42)

regulation on all models. The under-seat heater, first used on Studebaker cars last year, is continued for 1940 with larger core and fan capacity and detail change in sensitivity of regulation.

A number of important detail changes will be found in the mechanical units. All models are fitted with the same type of remote gear shift control as was adopted on the Champion last year. On the Commander and President models, this entailed a detail change in the transmission,

using precisely the same type of design as on the Champion. This means, in effect, that the housing has been rolled back so that the cover is again on top, with shift lever coming out of the side.

Propeller shaft design has been changed on the Champion with standard transmission, adopting a Spicer balanced slip joint mounted at the end of the transmission mainshaft. This eliminates the slip joint in propeller shaft itself, permits better balance of the entire propeller shaft and joint assembly, practically eliminating another possible source of vibration.

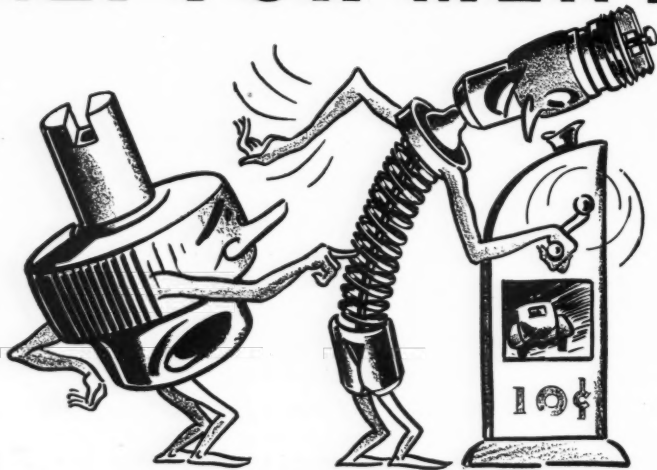
More rubber has been added at strategic points. The pitman arm now

has rubber bushings for the connection to the drag link end. Harris bushings have been adopted for the rear spring shackle mountings on both the Commander and President. There is more reduction in the steering gear on both the Commander and President, effected by changing gear ratio and leverages.

Sight Feed Has New A.C. Arc Welder

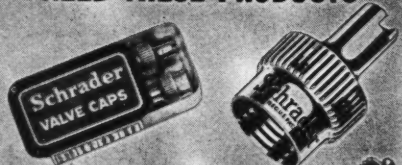
Completely redesigned, the new A. C. arc welder is being presented by the Sight Feed Generator Co., Richmond, Ind. Furnished in four sizes, the new models feature amperage control, voltage control and reactance control. Scientifically constructed transformer current enables Sight Feed Welders to maintain their

ONLY FOR MEN...

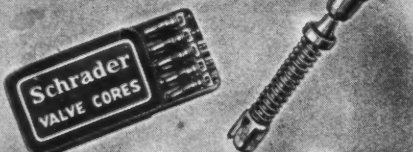


who want to make more money!

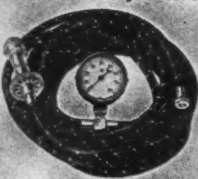
DEALERS WHO SERVICE TIRES NEED THESE PRODUCTS



Buy 50 or 100 Schrader Cores or Caps in metal boxes and you get a display container.



Schrader Tire Gauges—a complete line for service and resale.



Spark Plug Tire Pump Profitable To Sell. Operates from auto, truck, or tractor motors. Saves time and work.

Take a peek at these profit-making ideas: Replace the old valve parts in every tube you repair. It gives you a dime more per job and protects your repair work, too. Customers willingly pay for the parts when you explain that the patch job, plus the new core and cap, assures a 100% air-tight job.

Make a habit of selling replacement caps at the air stand, too. The few seconds it takes will give you a profit from your "free" air service.



25 handout slips to help you sell tire valve caps.

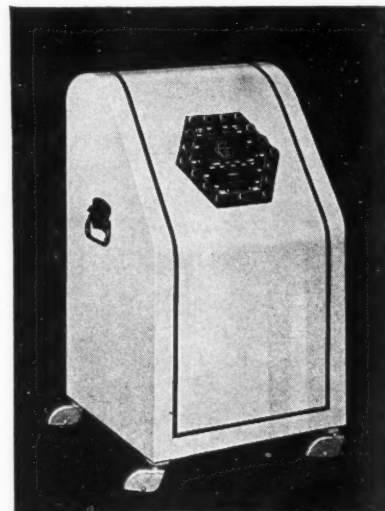


25 bill-form envelopes for returning old cores and caps from repaired tubes.

Write to Schrader for FREE supply.

Schrader TIRE VALVE PARTS and ACCESSORIES

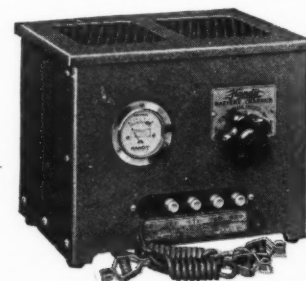
A. SCHRADER'S SON Division of Scovill Manufacturing Company, Incorporated BROOKLYN, N. Y.



stated amperage even though in continuous operation. Ample cooling is provided, eliminating hot spots. Cables are of the plug-in type, making instant selection of the desired amperage possible.

New Battery Charger Announced by Baldor

The Baldor Electric Co., 4351 Duncan Ave., St. Louis, Mo., announces the development of new wall type chargers identified as models F-6 and F-12. According to the manufacturer, the new models are cooler in operation, have an improved method of regulating the charging rate, are furnished with long direct current leads



and clips, and embody other improvements in design and construction. Illustration is of model F-12, which will handle from one to 12 batteries at a 6 ampere rate.

LINCOLN

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attracts trade—turns out better jobs in less time—builds profits



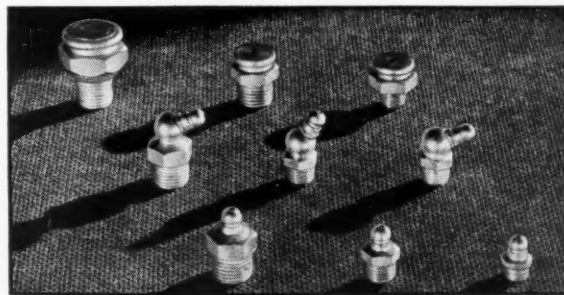
GROUP COMBINATIONS, of the type shown above, make it economical for you to modernize your shop with Lincoln Lubricating Equipment.

The illustration shows one of many different combinations that are available.

Some groups are larger than the one shown, and some are smaller. Some are for portable use; others for stationary installation. But no matter what your requirements are—you will find that Lincoln makes the right combination for your need . . . Groups, as well as other equipment in the complete Lincoln line, are illustrated and described in Catalog No. 52 . . . Ask your Lincoln jobber for a copy, or write us.

**"It's better to buy LINCOLN
than to wish you had"**

**LINCOLN KLEENSEAL
FITTINGS** are Standard Equipment
on cars, trucks and tractors—and
are also available for service needs



LINCOLN KLEENSEAL FITTINGS represent an important advance in automotive lubrication. Quickly, cleanly and easily contacted by Lincoln KLEENSEAL Nozzles . . . Available in all sizes and types . . . Can be purchased in bulk, on display cards, or in sealed cans . . . Be sure to ask your Lincoln Jobber about Assortment No. 5593, as well the complete KLEENSEAL line covered by Catalog No. 70.

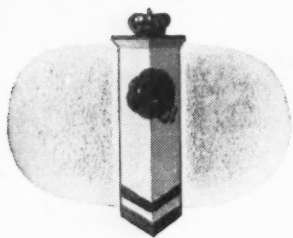


LINCOLN ENGINEERING COMPANY

Pioneer Builders of Engineered Lubricating Equipment

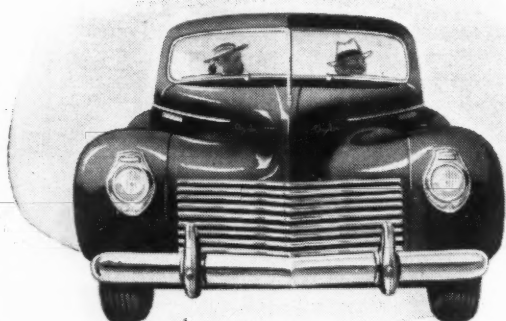
ST. LOUIS, MO., U. S. A.





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THE BEAUTIFUL

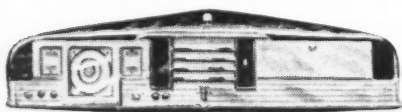


Again you get the good things first from Chrysler! A wealth of good things! New modern beauty . . smart new front-end design . . . new low, sweeping lines . . . all passengers cradled at the center of balance for a better ride . . . more room . . . more power . . . more for your money! Let a ride convince you! Ask the nearest Chrysler Dealer.

A BEAUTY FOR ROOM! Big, deep, comfortable seats . . . inches wider, and marvels of softness new to motoring . . . 3 inches more leg room, top-hat head room . . . room to move around. Big, wide doors like house doors . . . no cutaway at the door-bottom to soil a party frock! Bigness where bigness counts!



SEATS LIKE DIVANS

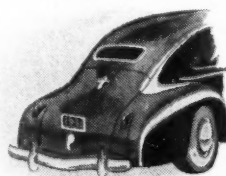


NEW PLASTIC INSTRUMENT PANEL

Chrysler panel of 1939! Smart new hardware . . . magnificent upholstery fabrics of custom car quality, and custom car tailoring . . . a complete harmony of color, line and modern design . . . more vision in the new, bigger windows!

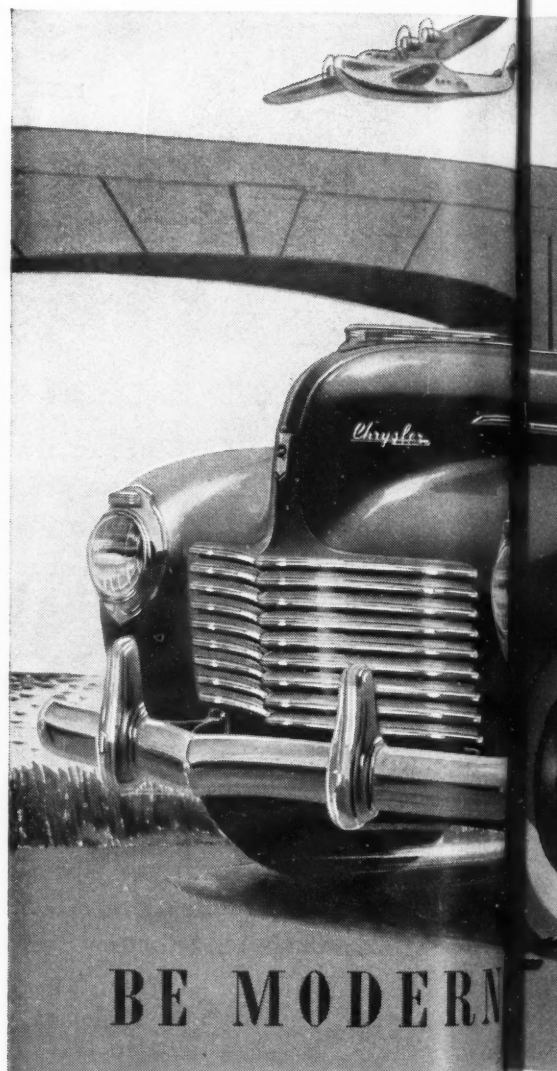
A BEAUTY IN APPOINTMENTS!

An exquisite new instrument panel of moulded plastic . . . smart as a jeweler's window . . . even handsomer than the prize-winning



SMART REAR-END DESIGN

A BEAUTY IN EVERY LINE! For the first time, a car that's a complete modern unit of design! No



hangovers from yesterday in its long, low lines . . . sweeping curves . . . graceful front end . . . new beautiful rear with smart curved-non-glare window . . . trunk lines of low-swung grace. Longer wheelbase . . . even lower center of gravity!

A BEAUTY FOR COMFORT! Chrysler pioneered scientific weight distribution in the famous and costly Airflow. Now Chrysler provides scientific weight distribution

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CHRYSLER FOR 1940



Buy Chrysler!

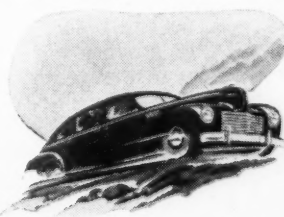
every model of the 1940 Chrysler line! Passengers are cradled in the middle of the car . . . away from the bouncing rear axle. Chrysler's modern scientific balancing and springing and extra-strong, shockproof X-braced frame give amazing new comfort.



SCIENTIFIC WEIGHT DISTRIBUTION

A BEAUTY FOR PERFORMANCE! For 1940, new, more powerful *Speedking* engines... smoother, more economical,

with famous Floating Power and Superfinished bearing surfaces, smooth to as little as a millionth of an inch! Flashing pickup . . . tireless touring speeds . . . worlds of



MORE POWER, FLASHING PICK-UP

reserve power! Chrysler's famous *All-Steel* bodies and hydraulic brakes . . . and on some models Chrysler's newest miracle, Fluid Drive. The beautiful Chrysler is 1940's greatest value!

Feature Equipment To Attract Customers

Wagner and Trotman Find Investment Pays

Lower labor costs on repair jobs are an important factor in developing a growing list of customers, according to Wagner and Trotman, Shoemakersville, Pa., whose modern garage equipment is used to impress car owners that labor costs are lower when the proper tools are used.

Customers entering this garage for the first time don't have to stare and wonder about the uses of all the gadgets and machines in the place. They are told about the functions of the va-

rious machines and why their use cuts labor costs to a minimum.

"Most customers seem keenly conscious of the fact that labor costs accumulate rapidly. Many of them seem to be constantly figuring on how much time they must pay for at a dollar an hour," said J. A. Wagner. "Since labor expense is the thing that keeps people away from the repair shop as long as possible, our duty is to emphasize that we are equipped to keep those costs at a minimum and that de-

laying repair work means increased expense.

"There was a time when we thought an outlay of several hundred dollars for a piece of equipment could not be recovered in a long while. We know that this is wrong because whenever we install some additional labor-saving equipment we increase our list of customers."

In addition to motor analyzers and electrical testing equipment, the garage also features its new equipment for cleaning and repairing radiators. The volume of work has made it economical to install a heater and boiler to keep a constant supply of hot water on hand for use with the pressure pump. Being fully equipped for radiator service at all times has brought work of this type from other shops who do not want to invest in modern equipment.

Another reason for the constant increase of business here is a working schedule that keeps the shop open until midnight. In explaining the reason for this Wagner explained: "Most of our customers work during the day and use their cars every day, and by keeping our shop open at night we enable them to have their repair work done so that it doesn't interfere with their work. Most of our shop work is done after 3 o'clock in the afternoon. While a working schedule of this kind isn't as pleasant as the usual garage hours, we arrange our own time according to our customers' requirements rather than to please ourselves."

There's Always a FIRST!



AND PURITAN is the *first* UNIVERSAL Brake Fluid!

The *first* one to mix with all others—the *first* one to absorb water and, therefore, reduce the corrosion hazard—the *first* non-gumming, free-flowing, self-flushing fluid—the *only* one developed 100% for REFILL use.

Made in Two Grades
PURITAN REGULAR—For ordinary passenger car service—priced for that trade.

PURITAN SUPER—A new extra heavy duty fluid for high temperature, severe usage. A "premium" fluid that's worth it!



When You Buy for Refill Buy a REFILL Fluid

Avoid a "compromise" fluid . . . avoid "original equipment" castor-oil base fluids . . . avoid cheap glucose and glycerine "gymps!" For *refill* use buy only the *genuine* REFILL fluid—PURITAN!

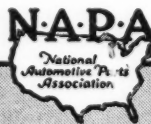


The Only Fluid Engineered Expressly for REFILL Use

PURITAN

HYDRAULIC BRAKE FLUID

PURITAN SOAP CO., INC., ROCHESTER, N.Y.



Flexible Fuel Line Display

The Imperial Brass Mfg. Co., 1200 W. Harrison St., Chicago, Ill., is offering a new flexible gas and oil line display rack for dealers. The rack is of steel construction, attractively finished in orange and black, and has a label which shows the part

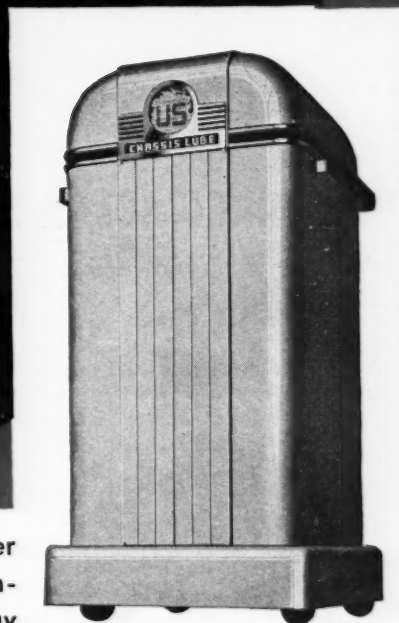


number of each line. In addition, each of the 12 lines it contains is individually labelled to show its number and the cars it fits, as well as the retail price. The display unit is designated as No. 156-FT, and sells to the dealer complete with 12 flexible lines at \$3.70.



IT'S NOT WORK...

IT'S CHILDSPLAY



• An "eight year old" can quite easily change grease drums in a U. S. Air Clipper equipped with the famous patented (Nos. 2,105,990-2,105,991) U. S. Jack-in-the-box cover. None of this hard, dirty, messy work of struggling your way through, smearing grease all over the beautiful cabinet and getting grime and dirt on gun, pump and hose—that's out entirely. No dismantling of cabinet, heavy lifting or football tactics required. Merely insert air hose in the base of the U. S. Air Clipper and a breath of air raises entire cabinet on two air pistons and holds it there while changing grease drums. It's simple, easy, fast and clean, a job for a youngster, not a husky. **It's a beauty with brains**—mechanical brains found in no other unit. Costs no more to own or to operate.

U. S. AIR CLIPPERS

are beautifully finished in baked enamel. Quick opening swing doors conceal special compartment in which is housed the hose and nozzle.

THE U. S. AIR COMPRESSOR COMPANY

Air Compressors

Cleveland, Ohio, U.S.A.

Hydraulic Lifts

Greasing Equipment

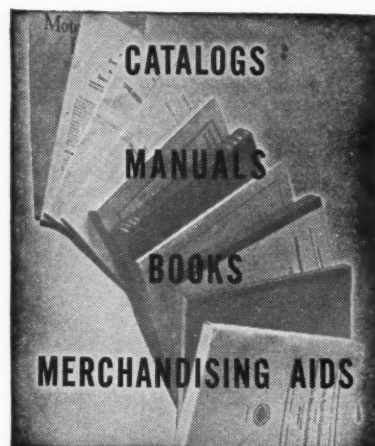
"ABC of Aviation"

The Simplified Guide to Modern Aircraft. By Lt. Col. Victor W. Page, U. S. Air Corps Reserve. 436 Pages, 200 Illustrations, Cloth Bound, \$2.50. Published by The Norman W. Henley Publishing Company, 2 West 45th Street, New York City.

This is an enlarged and revised edition of a text book that has received wide recognition as an elementary treatise on aviation fundamentals, written especially with the requirements of the non-technical adult or the youthful student in mind. Previous editions were considered ideal for

flying clubs and ground school. The new edition, just off the press, has been so thoroughly re-edited, revised and enlarged that it is practically a new book.

It contains twelve chapters. Each chapter is followed by a quiz so the reader can test his newly acquired knowledge. All technical terms are defined and explained so they can be easily understood by the lay reader. Anyone wishing to secure a practical ground work of aviation facts will find this treatise well worth studying, especially when one considers the important part aviation plays in our daily lives.



Illustrating and describing 995 different tools and 102 different, complete tool sets, Bonney Forge & Tool Works, Allentown, Pa., has just issued its new No. 139 tool catalog. It is in convenient 5 in. x 7 in. size and contains 88 pages.

Catalog No. 139, by the Packard Electric Division of General Motors Corporation, has been released to the trade. It contains a complete listing of Packard cables, wiring assemblies, terminals and connector plugs.

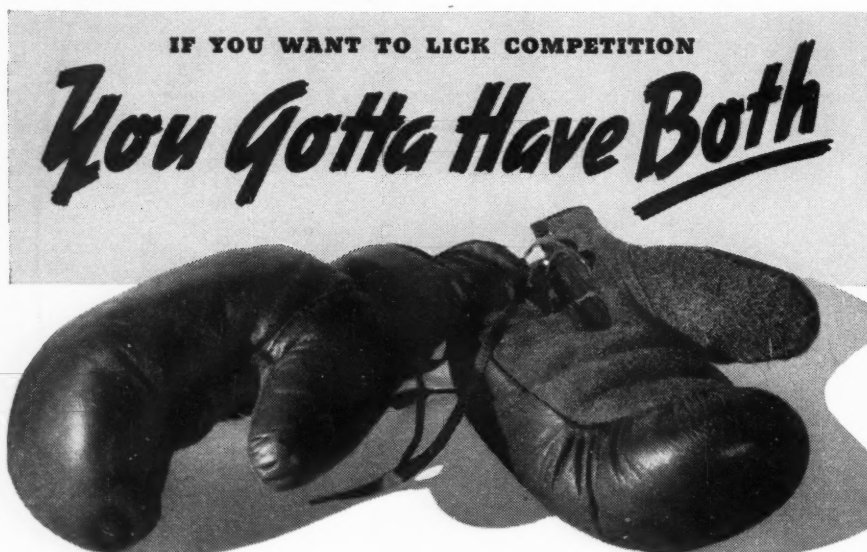
K-D Mfg. Co., Lancaster, Pa., has just published a new valve service bulletin covering Ford V-8-60, Ford V-8-85, Mercury and Lincoln-Zephyr motors. In addition to service procedure, the book also prescribes clearances and tolerances, and furnishes helpful shortcuts for the mechanic. The bulletin is designated as No. 739.

The Electric Auto-Lite Co. of Toledo, Ohio, has issued an illustrated booklet describing the company's latest product, the new "sealed beam" headlight now being used on the 1940 model cars. The booklet describes the construction of the light unit, and covers replacement instructions.

New wheel balancing manual—complete information on the operation of Dynamic Wheel Balancing Equipment, methods of merchandising and selling of wheel balancing service and explanations and solutions of practically every wheel balancing problem encountered by the service man is contained in a new manual compiled by the Bear Manufacturing Co., Rock Island, Ill., for the use of shop, service station, garage owners and service men. A copy may be obtained by writing direct to the above company.

K-D Turn Signals

The K-D Lamp Co., 610 W. Court St., Cincinnati, Ohio, calls attention to its direction turn signal known as Sho-Turn, Jr. The lens is of duotone construction made of heavy plastic material producing an opalescent lens when unlighted but becoming a uniform amber color when lighted, distinctly visible day or night at 100 feet. The entire mask including arrow can be rotated, but is self-locking to the required position. It can be used with manual, automatic or semi-automatic switch, and is available in single or double face.



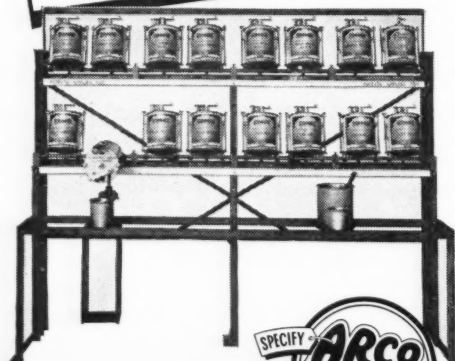
ONE ARCO COLOR MACHINE GIVES YOU *Both* TRANSO AND LACQUER

• Lacquer alone won't do a complete spotting-in job. You've got to have Transo to touch up cars with baked enamel finishes. If lacquer is used over baked enamel, it looks O. K. when it leaves the shop, but as it weathers, the patch becomes noticeable. A Transo touch-up doesn't show up, because it has weathering properties like the original baked enamel finish... yet it dries with the speed of lacquer.

You don't need *two* machines to get lacquer and Transo. *One* Arco Machine gives you *both*. And it gives you much more—(1) Big Savings in Inventory; (2) Transo and ALL lacquer colors for ALL cars since 1933; (3) Just enough color for each job—no waste or waiting; (4) Half pints at gallon prices. Ask your jobber or write today for details.

THE ARCO COMPANY
CLEVELAND • LOS ANGELES

FOR ONLY \$8.00 A YEAR
You don't have to buy this machine. You can lease an Arco Color Machine for your own shop for only \$8 a year. If you use only 3 pints of color a day, you can make over \$300 a year in extra profits on this \$8 investment.



THE ARCO COLOR MACHINE



Controls Paint Mixing

A new product of The Ganson Co., 3227 W. Lake St., Chicago, Ill., provides a sure method of controlling the mixing of lacquers, paints or enamels for the refinishing of automobiles. The Ganson Flow-Meter instantly tells the operator whether his proportion



of paint and reducer is correct for the perfect trouble-free job, regardless of the amount of paint used. It enables him to quickly duplicate any job, and is equally effective for any type of finish whether applied with brush or gun. Neatly finished in wrinkle-baked enamel and polished nickel, the Ganson Flow-Meter is easy to understand and use.

Pontiac

(Continued from page 19)

ing of volume directly over the cylinder bore, said to promote better combustion control and volumetric efficiency. Cylinder head for the Eight is continued without change except for compression ratio, using the double-button type combustion chamber design. Increased power is secured on the series 40-29 by the adoption of a dual carburetor.

The one-piece exhaust manifold with integral intake manifold developed for last year's Six remains unchanged except for a slight improvement in distribution effected by enlarging the two center branches on the intake manifold. The same type of manifolding, has been adopted on the Eight. The exhaust damper is provided with positive internal stops in both open and closed positions.

Carter carburetors of 1 1/4 in. nominal with integral automatic choke are used on both the Six and the Eight. On the latter, however, throat diameter has been increased by 1/8 in. This carburetor model has a stop in the accelerator pump cylinder limiting piston travel to 30 deg. of throttle valve opening. The idler bleed on this model is relocated to place it in the path of the mixture.

Self-locking connecting rod bolts replace the castellated nuts and cotters formerly used. The single-spring clutch used last year is continued unchanged save for an improved method of attaching the clutch throwout bearing plate.

The Pontiac Safety Shift for gear shifting remains the same except for changes in the linkage. The pull type cable selector has been discarded in

favor of positive rod-and-lever control both for shifting and selection, reducing further the gear shifting effort.

Generator capacity has been increased to 37 amperes at 30 m.p.h. Full voltage-current regulation is standard on all models.

Frames for both the 40-25 and 40-29 are entirely new to accommodate longer wheelbase, and the new wider bodies. Basic features of Pontiac design—straight X-members, box-girder side rails forward of the dash, and box-girder front cross members—are retained. The frames for the 40-26 and 40-28 remain unchanged.

Floating upper and lower king pin bushings are improved by providing a bearing on both the outer and inner

surfaces. Steering knuckle inner wheel bearing seat has been increased by 3/32 in. in diameter, necessitating an inner bearing race of larger bore, the latter being interchangeable with other G. M. cars.

Series 26 and 28 models with running board aprons are provided with a shallow, triangular molded rubber front fender stone shield, attached to the lower rear edge of the front fender.

The hypoid rear axle is continued without change save for gear ratio 4.3 to 1 on all models. In production, the rear axle pinion rear bearing surface is Superfinished, dimensionally true and without measurable surface defects.

RUTH FREEZEMETERS AND HYDROMETERS

THE QUALITY LINE FOR ACCURACY AND SERVICE

NO 136 RUTH FREEZEMETER ►

A universal type that will give the freezing point of denatured alcohol, methanol and ethyleneglycol anti-freeze solutions. List of popular brands of anti-freeze showing basic classification furnished with each instrument. Scientifically designed. Barrel fabricated of heavy annealed glass. 6-ounce Bulb draws ample solution for accurate testing. Long Float for precise reading. Calibrated from anti-freeze manufacturers' data checked by our own laboratory. Quick-acting, reliable Thermometer in same solution as float. Easy-to-read, hermetically-sealed chart with large, clear numerals. Straight barrel allows easy cleaning; black rubber parts minimize grease and dirt stains. 15-inch tip reaches fluid in deepest radiators; hexagon-shaped base to prevent rolling.

◄ NO 131, 132 and 135 FREEZEMETERS

For testing single solutions: Denatured alcohol, ethyleneglycol or methanol. All charts self-contained, accurately calibrated, easy to read. Quick-acting and reliable thermometer. Float protected by rubber bumper. 15-inch tip, hexagon-shaped base to prevent rolling. 2-oz. bulb. Barrel of heavy annealed glass.

NO 10 HYDROMETER ►

A standard tapered-barrel Hydrometer of highest quality. Retested ball bottom float. Heavy weight glass, fully annealed. Rubber-Protected at both ends. Tapered barrel prevents float from sticking. 2-oz. bulb; all parts interchangeable. Overall length 13 inches.

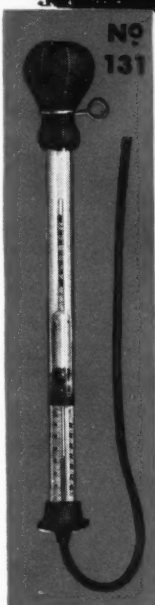
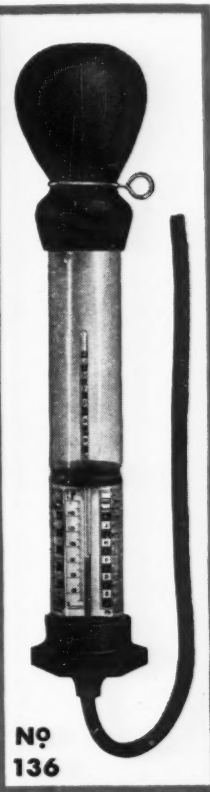
◄ NO 140 NEW THERMO-HYDROMETER (Squat)

A scientific instrument for accurate testing of storage batteries. Sturdy construction. Quick reading thermometer with temperature correction chart showing error in specific gravity due to changes in temperature. Black rubber. Retested float. Short hard rubber tip. Hexagon-shaped base prevents rolling. 2-oz. bulb. Overall length 13 inches.

These instruments are distributed to Automotive Jobbers by
THE WEATHERHEAD COMPANY, CLEVELAND, OHIO

RUTH GLASS DIVISION  CONSHOHOCKEN, PA.

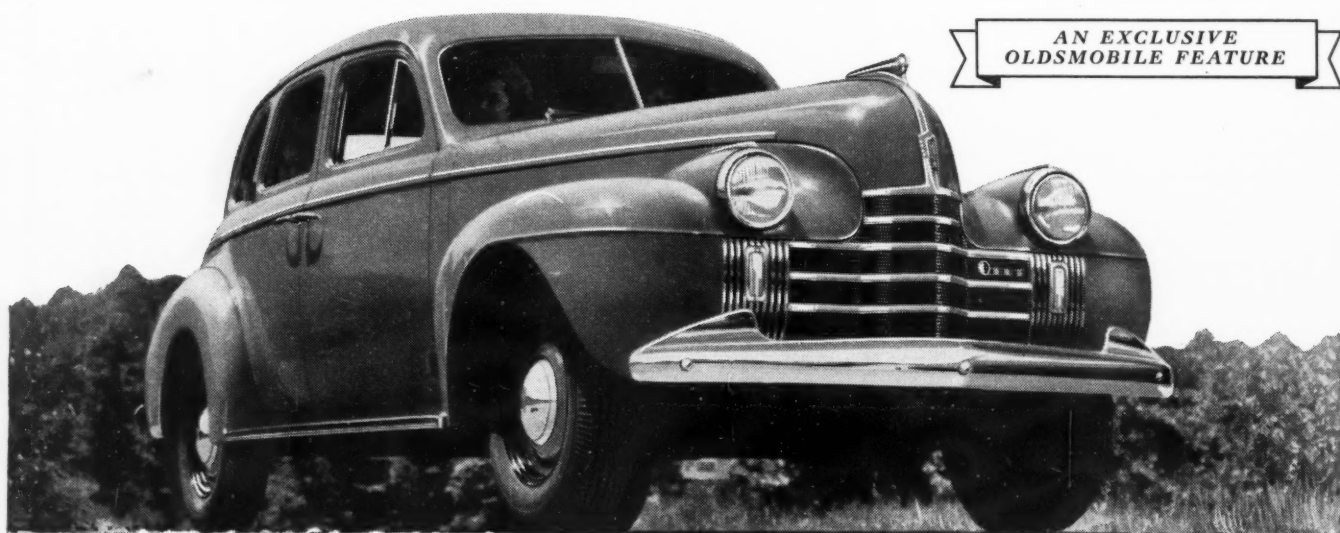
• • • The Visible Guarantee of Invisible Quality • • •
KIMBLE GLASS COMPANY • • • VINELAND, N. J.
NEW YORK • CHICAGO • PHILADELPHIA • DETROIT • BOSTON



Again OLDS Dealers Get

HYDRA-MATIC DRIVE !

**THE MOST IMPORTANT
ENGINEERING ADVANCEMENT
SINCE THE SELF-STARTER !**



NO GEARS TO SHIFT... NO CLUTCH TO PRESS !

ALL YOU DO TO DRIVE IS



the Jump on Competition!



No Clutch Pedal!

Hydra-Matic Drive eliminates the clutch pedal and all clutch parts. You can set the direction lever for "Hi" and drive all day without shifting gears or using your left foot. You'll experience getaway without a rival—smoothness and quietness hitherto unknown—hill-climbing ability no other car can offer. It's the one BIG advancement in the 1940 cars!

1940's DEMONSTRATION SENSATION!

ONCE again Oldsmobile dealers have the biggest and most convincing story in the industry to attract prospects and clinch sales. Not only is Oldsmobile the best-looking car on the road for 1940—not only does the Oldsmobile line cover the entire market from the low-price field to the fine-car custom class—but Oldsmobile offers the *one big, exclusive engineering advancement for 1940... Hydra-Matic Drive!* This spectacular new method of car control combines all the advantages of a liquid flywheel and a completely automatic transmission. It is not an extra

tacked onto the car, but replaces both the conventional clutch and transmission. Demonstrations are sensational, because Hydra-Matic Drive steps up performance to glorious new highs—reduces driving to its simplest, easiest terms—produces measurable savings in gas and oil. Hydra-Matic Drive is optional at extra cost on all three Oldsmobiles—the big, handsome low-priced Sixty—the stunning new popular-priced Seventy—and the luxurious, medium-priced Custom 8 Cruiser. Go BIG with Olds in 1940! Make money by selling America's Biggest Money's Worth!

OLDSMOBILE

BIGGER AND BETTER IN *Everything!*

Motor Car Price, Weight and Body Table

Following are delivered prices at factory for cars with standard equipment and include all federal taxes with exception of Ford, Lincoln, Lincoln-Zephyr, Mercury, Overland and Willys. Optional equipment, state or local taxes, transportation charges and finance charges are extra.

BODY, MAKE AND MODEL	Delivered Price	Shipping Weight	BODY, MAKE AND MODEL	Delivered Price	Shipping Weight	BODY, MAKE AND MODEL	Delivered Price	Shipping Weight	BODY, MAKE AND MODEL	Delivered Price	Shipping Weight	BODY, MAKE AND MODEL	Delivered Price	Shipping Weight	BODY, MAKE AND MODEL	Delivered Price	Shipping Weight
BANTAM			CHEVROLET			DODGE			HUDSON (Continued)			NASH			PACKARD (Continued)		
65			Master 85			Special D17			Vict. Coupe, 5p.	860	2980	Nash-LaFay.			Model 1808		
Std. Coupe, 2p.	399	1261	Bus. Coupe	2895		Coupe, 2p.	755	2867	Sedan, 4d., 5p.	870	3050	Bus. Coupe	795		Tour. Limousine	2654	4585
Master Cou., 2p.	449	1271	Twn.Sed., 2d., 5p.	2945		Sedan, 2d., 5p.	815	2842	Conv. Coupe, 5p.			Sedan, 2d.	845		Tour. Sedan	2526	4510
Master Road., 2p.	449	1211	Sport Sed., 4d., 5p.	2960		Sedan, 4d., 5p.	855	2997	C. Broug., 2d., 6p.			A. P. Coupe	850		Rollson A. W.		
Pickup Truck	475	1256	Stat.Wag., 4d., 8p.	3050								Sedan, trk., 4d.	875		Town Car*	4575	4175
Panel Truck	489	1331				De Luxe D14			Country Club			A. P. Cabriolet	975		*F.O.B. New York City		
Conv. Coupe, 2p.	525		Special			Coupe, 2p.	803	2905	6-43			Ambassador 6					
Conv. Sed., 4p., 2d.	549	1296	De Luxe			Coupe, 2-4p.	855	2975	Sedan, 4d., 5p.	1018	3240	Bus. Coupe	925		PLYMOUTH		
Stat.Wag., 4p., 2d.	575	1411	Bus. Cou., 2d., 2p.	2965		Conv. Coupe, 5p.	860	2990	Sedan, 4d., 7p.			Sedan, 2d.	955		Roadking		
			Coupe, 2d., 4p.	2965		Sedan, 2d., 5p.	905	3028				A. P. Coupe	960		Coupe	645	2769
			Twn.Sed., 2d., 5p.	3025		Sedan, 4d., 5p.	1095		Eight-44			Sedan, 4d.	985		Tour.S., 2d., 5p.	699	2834
			Sport Sed., 4d., 5p.	3060		Sedan, 4d., 7p.	1170		Coupe, 3p.	860		Sedan, trk., 4d.	985		Tour.S., 4d., 5p.	740	2869
			Cabriolet, 2d., 4p.	2995		Limousine, 7p.			Sedan, 4d., 6p.	942		A. P. Cabriolet	1085		Util.Sed., 2d., 2p.		
			Stat.Wag., 4d., 8p.	3100					Conv. Coupe, 5p.	952							
BUICK			Master			FORD			C. Broug., 2d., 6p.			Ambassador 8			De Luxe		
Special 40-40			De Luxe			V8-60			Country Club			Bus. Coupe	1135		Coupe	725	2804
Bus. Coupe	895		Bus. Cou., 2d., 2p.	2950		Coupe			8-47			Sedan, 2d.	1165		Coupe, 4p.	770	2849
Sport Coupe	950		Twn.Sed., 2d., 5p.	3010		Coupe			Sedan, 4d., 5p.	1118	3285	A. P. Coupe	1170		Conv. Cou., 2-4p.		
Tour.Sed., 2d., 5p.	955		Spt. Sed., 4d., 5p.	3045		Tudor Sedan			Sedan, 4d., 7p.			Sedan, 4d.	1195		Tour.S., 2d., 5p.	775	2889
Tour.Sed., 4d., 5p.	996					Fordor Sedan						Sedan, trk., 4d.	1195		Tour.S., 4d., 5p.	805	2924
Conv. C., 2d., 5p.	1077											A. P. Cabriolet	1295		Sedan, 7p.		
C. Phae., 4d., 5p.	1355		CHRYSLER			V8-85			LA SALLE						Sedan Lim., 7p.		
Super 40-50			Royal Six			Bus. Coupe			40-50			OLDSMOBILE			Stat. Wag., 8p.		
Sport Coupe	1058		Coupe, 3p.	895	3075	Coupe			Coupe, 2p.			Six-Series 60					
Tou.Sed., 4d., 6p.	1109		Coupe, 5p.	960	3110	Tudor Sedan			Tour. Coupe, 5p.			Bus. Coupe, 3p.			PONTIAC		
Century 40-60			Vict. Sedan, 6p.	980	3150	Fordor Sedan			Tour. Sedan, 5p.			Club Coupe, 3-6p.			Special Six		
Tou.Sed., 4d., 5p.	1211		Sedan, 8p.	995	3175				Conv. Coupe, 2p.			Sedan, 2d., 6p.			40-25		
Conv. Cou., 2d., 5p.	1343		Limousine, 8p.			De Luxe			Conv. Sed., 5p.			Sedan, 4d., 6p.			Bus. Coupe, 3p.	3065	
C. Phae., 4d., 5p.	1620					V8-85			Conv. Sed., 5p.			Conv. Cou., 3-6p.			Sport Coupe, 6p.	3120	
Roadmaster			Windsor Six			Bus. Coupe						Station Wagon			Tour. S., 2d., 6p.	3130	
40-70			Coupe, 3p.	935		Coupe			40-52						Tour. S., 4d., 6p.	3170	
Sport Cou., 2d., 6p.	1277		Coupe, 5p.	995		Tudor Sedan			Tour. Sedan, 5p.			Six-Series 70			De Luxe Six		
Tou.Sed., 4d., 6p.	1359		Conv. Coupe, 5p.			Fordor Sedan			Coupe, 2p.			Bus. Coupe, 3p.			40-26		
Limited 40-80			Vict. Sedan, 6p.	995		Conv. Club Cou.						Club Cou., 3-6p.			Bus. Coupe, 3p.	3105	
Tou.Sed., 4d., 6p.	1553		Sedan, 6p.	1025	3210							Tour.Sed., 2d., 6p.			Tour. S., 2d., 6p.	3160	
For. Sed., 4d., 6p.	1727		Sedan, 8p.	1275		GRAHAM			LINCOLN			Tour.Sed., 4d., 6p.			Tour. S., 4d., 6p.	3210	
C. Phae., 4d., 6p.	1952		Limousine, 8p.	1350		Special			V-12—136 in.			Conv. Cou., 3-6p.			Sport Coupe, 6p.	3165	
Limited 40-90			Traveler-Eight			Comb. C., 5p., 2d.			Sedan, 5p., 2w.			Tour.Sed., 4d., 6p.			Cabriolet, 6p.	3170	
Tou.Sed., 4d., 6p.	1942		Coupe, 3p.	1095	3475	Sedan, 2d., 5p.			Sedan, 5p., 3w.								
Tou.Sed., 4d., 8p.	2096		Coupe, 5p.	1150	3525	Sedan, 4d., 5p.			Conv. Road.LeB.						De Luxe		
Limo., 4d., 8p.	2199		Vict. Sedan	1150					Coupe, LeB.			PACKARD			40-28		
			Sedan	1180	3590	De L. Special			Brunn Conv.Vict.			One Ten,			Bus. Coupe		
CADILLAC						Comb. C., 5p., 2d.			Wilby. Coupe, 5p.			Model 1800			Tour. S., 2d., 6p.	3120	
Series 40-60S			New Yorker			Sedan, 2d., 5p.						Bus. Coupe	867	3120	Tour. S., 4d., 6p.	3165	
Tour. Sed., 5p.			Eight			Sedan, 4d., 5p.			V-12—145 in.			Club Coupe	924	3165	Cabriolet		
Tou.Sed., Div., 5p.			Coupe, 3p.	1175					Sedan, 7p.			Conv. Coupe	1087	3200	Sport Coupe, 6p.		
			Coupe, 5p.	1230		Custom Spec.			Limousine, 7p.			Tour. Sedan, 2d.	944	3190	Torpedo		
Series 40-62			Conv. Coupe, 5p.	1230		Comb. Cou., 5p.			Conv.Sed.LeB.			Tour. Sedan, 4d.	975	3200	Eight		
Tour. Sedan, 5p.			Vict. Sedan, 6p.	1260	3635	Sedan, 2d., 5p.			Jud. Berline, 2w.						40-29		
Coupe, 2p.			Sedan, 6p.			Sedan, 4d., 5p.			Jud. Berline, 3w.			One Twenty,			Sport Coupe		
Series 40-72			Saratoga						Wilby. Limo.			Model 1801			Tour. S., 4d., 6p.		
Tour. Sedan, 5p.			Eight			Supercharger			Jud. Sed. Limo.			Bus. Coupe	1038	3340			
Coupe, 2p.			Sedan, 6p.			Comb. C., 5p.			Brunn Cabriolet			Club Coupe	1095	3450			
Series 40-75			Crown Imp.			Sedan, 2d., 5p.			Brunn Brougham			Conv. Coupe	1258	3540	STUDEBAKER		
Tour. Sedan, 5p.			Sedan, 8p.			Sedan, 4d., 5p.			Wilby.Spt.Sed.5p.			Conv. Sedan	1550	3710	Champion		
Tou.Imp.Sed., 7p.			Limousine			De Luxe			Brunn Tour.Cab.			Tour. Sedan, 2d.	1115	3510	Custom		
Bus.Tou.Sed., 7p.						Supercharger						Tour. Sedan, 4d.	1146	3520	Coupe, 3p.		
Bus.Tou.Imp., 7p.						Comb. Cou., 5p.			LINCOLN-ZEPHYR			Club Sedan, 4d.	1217	3520	Club Sedan, 2d.		
			CROSLEY			Sedan, 2d., 5p.			Standard						Cruising S., 4d.		
Series 40-75			Conv. Coupe, 2p.	337	933	Custom			Coupe			Super Eight,			De Luxe		
Tou. Sedan, 5p.			Conv. Sedan, 4p.	362	950	Supercharger			Club Coupe			One Sixty,	1595	3760	Coupe, 3p.		
Tou. Sedan, 7p.						Comb. Cou., 5p.			Conv. Coupe			Model 1803	1775	3825	Club Sedan, 2d.		
Tou.Im.Sed., 7p.						Sedan, 2d., 5p.			Sedan, 4d.			Club Coupe	1717	4165			
Coupe, 2p.						Sedan, 4d., 5p.			Cont. Cabriolet			Conv. Sedan	1632	3855	Cruising S., 4d.		
Coupe, 5p.												Town Limousine	2050	4000			
Town Sedan, 5p.						HUDSON						Bus. Coupe	1524	3735	Commander		
Formal Sed., 5p.						Travel Six-40			Custom						Six		
Formal Sed., 7p.						Coupe, 3p.	670		Club Coupe			Model 1804	1895	4165	Coupe, 3p.		
Conv. Coupe, 2p.						Sedan, 2d., 6p.	735	2895	Conv. Coupe			Tour. Sedan, 4d.			Club S., 2d., 6p.		
Conv. Sedan, 5p.						Vict. Coupe, 4p.	750		Town Limousine			Model 1805	2154	4500	Sedan, 4d., 6p.		
Town Car						Sedan, 4d., 6p.	763	2940	Cont. Cabriolet			Tour. Sedan	2026	4425			
Bus. Tou. Sed., 7p.												Custom Super			President		
Bus.Tou.Imp., 7p.						De L. Six-40						Eight			Coupe, 3p.		
Series 40-90						Coupe, 3p.	745					One Eighty,			Club S., 2d., 6p.		
Tou. Sedan, 5p.						Sedan, 2d., 6p.	775		MERCURY			Model 1806	2228	3900	Sedan, 4d., 6p.		
Tou.Sed.Div., 5p.						Vict. Coupe, 4p.	791		Twn.Sed., 4d., 6p.			Formal Sedan	2825	4210	WILLYS		
Tou. Sedan, 7p.						Sedan, 4d., 6p.	806		Sedan, 2d., 6p.			Tour. Sedan	2395	4210	Coupe		
Tou.Imp.Sed., 7p.						Conv. Coupe, 5p.			Sedan-Cou., 6p.			RollsonCab.A.W.	4450	4050	Sedan, 2d.		
Coupe, 2p.						C. Broug., 2d., 6p.			Club Conv., 5p.			DarrinConv.Sed.	4400	4400	Sedan, 4d.		
Coupe, 5p.									Conv. Sedan			Darrin Spt. Sed.	4400				
Town Sedan, 5p.						Super Six-41											
Formal Sed., 5p.						Coupe, 3p.	809	2950									
Formal Sed., 7p.						Sedan, 2d., 6p.	839	3020									
Conv. Coupe, 2p.																	
Conv. Sedan, 5p.																	
Town Car																	

Nash

(Continued from page 17)

only through the ventilator.

A new method of soundproofing, developed with the assistance of engineers of the electric refrigerator division of the Nash-Kelvinator Corporation, is applied to the bodies. It is known as the "Sand Mortex" system. Large quantities of the "sand mortex" are applied to the lower part of the body. In mounting the bodies on the frames, use is made of an insulating material known as "Fabreeca."

Nash 1940 cars have column-mounted gearshift levers. These are said to operate noiselessly, because all connections in the shifting mechanism are insulated.

Both front and rear seats in all models are three-passenger seats. The foam-rubber seat cushions introduced last year now are standard equipment on the Ambassador Six and Eight series and extra on the LaFayette series.

Aerial Hitch-Hiking

When New Jersey aviation officials heard about the motorist who thumbed an airplane ride after his car broke down it gave them an idea.

They set aside a 13-day period in September during which earthbound Jerseyites who were never "up" before were offered a free flight

Dodge

(Continued from page 15)

To further facilitate ease of shifting, first and reverse gears have a special form of tooth pointing, and new synchronizers are employed. Faces of first and reverse gears are wider to provide greater strength.

Despite the increased wheelbase and new sheet metal, the overall length of the bodies—bumper to bumper—remains practically the same. Front doors now are fitted with concealed hinges. Hancock rotary door latches are used on all doors. Ventilating wings in front doors can be opened to a wide angle. Rear windows in sedans lower completely.

All window glass is of the new high test safety plate glass which has been used on Chrysler Corp. cars since the early part of last year's production. The rear window is a large single piece of heat tempered glass, curved to suit the back panel lines.

Ramco Appoints Don Herr

From the desk of Mr. Jack Ramsey, president, Ramsey Accessories Mfg. Corp., comes the news of the appointment of Mr. Don Herr to take charge of sales in the States of Kentucky, Indiana, Illinois, Wisconsin, Minnesota, the Dakotas, Iowa and Missouri.

In Don Herr, RAMCO gets a man literally born and bred in the industry. It all started years ago when "Don" sold automobiles for Carl Fischer, then the only dealer in Indianapolis. Old timers will remember when in 1908 he joined the National Racing Team of Merz, Johnny Aitkin,

and Howdy Wilcox, where he remained until 1912. This team was entered in many famous races, including the Vanderbilt Cup Race.

In 1911 Don won the Elgin Road Race—was second at Fairmont Park—drove "relief" for Joe Dawson in the winning Stutz car of 1912 at the Speedway Race which was his last big event.

In 1912 Don and Howdy Wilcox formed a partnership in Indianapolis and started the Yellow Cab Co., which kept them together for nine years. In 1921 Don's next venture was a lone hand automobile service business in Indianapolis.

In recognition of his leadership in

this branch of industry, in 1934 the International Garage & Maintenance Association made him its president.

Ford

(Continued from page 16)

club coupe with automatic top as standard equipment.

A new convertible sedan appears among the five body types of the Mercury line, while two striking new body types have been added to the Lincoln Zephyr series. These are a club coupe and a Continental cabriolet which have tops which operate automatically.

THIS NEW
Clymer
WINDSHIELD
SPOTLIGHT IS
NEWS
... IT'S A
BRIGHTER WAY
TO BIGGER
PROFITS

*Clymer Spotlights are made under broad claim patents including those of Clymer-Fyrac group of 31 U. S. and foreign patents now owned by this company. Infringers will be prosecuted.

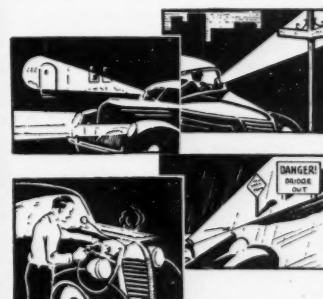
Clymer
SPOTLIGHT COMPANY
222 WEST PICO BOULEVARD
LOS ANGELES, CALIFORNIA

A MODERN, STREAMLINED SPOTLIGHT WITH OUTSTANDING NEW SALES FEATURES!

All over the country news of the NEW Clymer Spotlight is traveling fast. Built right and priced right, it's the newest profit line for jobbers and dealers. ¶ When you sell Clymer Spotlights, you know that you are going to make a profit and that your customers are going to be mighty well satisfied. Get aboard the bandwagon today! Find out about the opportunity that can be yours by selling Clymer Windshield Spotlights.

★ Here's why the new Clymer Windshield Spotlights sell:

1. A twenty-minute, easy installation.
2. ONE BRACKET FITS ALL CARS!
3. Powerful, bright beam is extremely effective in fog, rain or snow.
4. Insures safer driving at night; can be quickly converted for use as a trouble light or a camp light.
5. Beautifully made and designed of chrome and molded plastic.
6. And NATIONAL ADVERTISING... to help you sell!
7. The spotlight is the one auto accessory that has not been oversold.



MAIL THIS COUPON NOW!

This is GOOD NEWS! Send me full information on the special deals for dealers...FREE spotlight and cutter offer...and bigger profits.

Name _____
Company _____
Address _____
City _____
State _____ D-5

Buick

(Continued from page 12)

set-up for car heating with the under-seat type heater as standard equipment on the series 80 and 90.

Important change in the cooling system comes in the adoption of pressure cooling with the use of a radiator filler cap with a pre-loaded valve, holding the pressure to 7 lb. per sq. in. This is said to improve low speed operation at high temperatures, also to provide added heat to the hot water heaters. A composition resin-impregnated fabric washer replaces the for-

mer carbon seal in the water pump.

While the carburetor is of the same general design as before it incorporates some detail changes. It has a new bowl and the accelerating pump linkage is arranged to speed up the travel of the plunger through the first part of the movement. On the 40 and 50 carburetors, all metering pins have been removed, as had already been done on the larger engines.

The fuel line is arranged to damp out all sound or vibration from the fuel pump by introducing a flexible hose section consisting of Neoprene wound with piano wire, covered with canvas. Life of mufflers is increased by the use of lead-coated steel which

has high resistance to corrosion. Design is the same as before—straight through resonance type.

Engine mountings have been redesigned with greatly increased volume of rubber. At the rear, the mountings have been designed to transmit forward drive forces through more than twice the volume of rubber required for rear drive forces.

Front mountings have been set at right angles to the rotational movement of the power plant, differing from last year in that respect. The transmission steady-rest mounting is of the same design as the rear engine mountings.

A simplified vacuum-controlled starting motor switch is used on all models. Its mechanism is so arranged as to prevent clashing of starter gears after the engine has started. Important feature of the switch is the use of wiping contacts having a large contact area.

Extremely strong, rigid chassis frames have been developed for the 1940 Series 40 and 60 cars. Side rails are deeper by $\frac{3}{4}$ in. at the rear kick-up progressing to $1\frac{1}{2}$ in. deeper at the dash. In addition, the stock thickness of the side rails has been increased. Another improvement is an increase in depth at the intersection of the X-member.

Due to the larger and wider bodies on the 50 and 70, the chassis have been fitted with entirely new frames. While of the same general design, these frames have box-section side rails, wider X-member flanges. From the dash to the rear, these frames are wider and have parallel side members.

Series 80 and 90 frames remain unchanged save for strengthened front and engine cross members.

Many changes are incorporated in the shifting mechanism. The control lever now is a smaller diameter rod connecting with a small ball-socket at the inner end. Both shift lever and control rod are on top of the steering column. Selecting movement is effected by a rod within the hollow control shaft, shifting takes place by rotating the control shaft. Both cross-over and shift linkage now are of positive type, discarding the wire cable formerly used.

Series 40 and 50 transmissions now are fitted with roller bearings on the countershaft. All transmissions have the same type of rear bearing retainer.

Steering linkage on the 40, 50, 60, 70 models is of direct cross type in which the pitman arm is connected directly to one tie rod, this in turn being connected to the other tie rod.

Due to the higher speeds, brakes have been increased in size—to 12 x 2 $\frac{1}{4}$ in. on the 60 and 70; and to 14 x 2 in. on the 80. Composite brake drums are used on the 40, 50, 60, 70; cast iron on the 80 and 90.

Front suspension incorporates some important modifications. Chief change on the 40, 50, 60, 70 models is in the suspension system by rotating it backward 4 deg. which is said to increase responsiveness to steering, reduce squeal on turns. Lower control arms are assembled integrally with spring seat, bumper and stabilizer link brackets, and inner shaft. New composition bushings with steel shell are used in inner ends of the lower arms on all series except the 80 and 90 which are fitted with threaded steel bushings.



"THE TOPS" in Everything But Price!

YOU'LL like "Blue Streak" Battery Cables. They give you sales features not found in any other line—and they have that "Quality Look" that attracts.

"Blue Streak" Cables represent an outstanding achievement in the Battery Cable Field. And best of all, they cost no more! They're "the tops" in everything but price.

Hook up with this *better* line. It will prove a real booster for your battery cable business.

If your jobber can't supply "Blue Streak" send us his name

By the Makers of the Famous

"BLUE STREAK" AND "STANDARD" LINES

Ignition Parts Battery Cables Automotive Wire

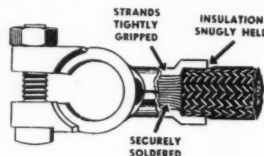
STANDARD MOTOR PRODUCTS, INC.

Main Office and Factory
37-18 Northern Boulevard
Long Island City, N. Y.

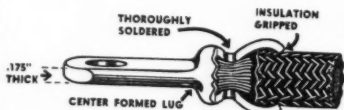
TERMINALS AND LUGS—Attached to cable under tremendous pressure. Individually soldered for perfect electrical connection.



TERMINAL — Double lead - dipped brass, extra heavy. Raised bolt allows room above battery to insert tool for easy removal. Specially designed to grip insulation as well as wires, eliminating strain on strands.



USUAL CONSTRUCTION



"BLUE STREAK" CONSTRUCTION

LUG—Twice as heavy as ordinary types. Withstands destructive vibration. "Center form" construction brings lug into position over bolt without twisting cable.

CABLE—Insulation heavily lacquered, an exclusive feature. Tremendous eye appeal. No. 1 gauge used; No. 0 for long cables.



"The ABILITY to serve well is as important as the WILL to do so."

Rubber seals are used on the outer ends of the control arms on all but the 80 and 90. On the latter, rubber seals are found at the inner ends of the lower control arms. Threaded bushings are used in the lower control arms on all series.

Major changes have been made in the rear axle and suspension for the series 40, 50, 60, 70. Torque tube and propeller shaft now are lone one-piece units with the universal joint directly back of the transmission. Rear springs are of larger I. D. (5½ in.) permitting a shorter spring height. In addition, the springs are nested about three inches closer to the rear axle centerline and above it.

Sunnen Portable Crankshaft Grinder

The Sunnen Products Co., 7910 Manchester Avenue, St. Louis, Mo., has announced a portable crankshaft grinder which can be used either as an attachment to a lathe, or can be bolted to the pan rail of the motor in the chassis. Thus it can be used to convert the lathe into a crankshaft grinder, or can grind the bearing journals while the shaft is in the engine. The cutting is done by a single thin-rimmed cup grinding wheel which is cross fed across the journal. Grinding is dry; no coolants required. Descriptive bulletin is available upon request.

A. S. Hecht

Alexander S. Hecht, president of the Guaranteed Parts Company, Inc., of Seneca Falls, New York and known throughout the trade as the father of the replacement ignition parts industry, died suddenly at his home in Union Springs, N. Y., recently.

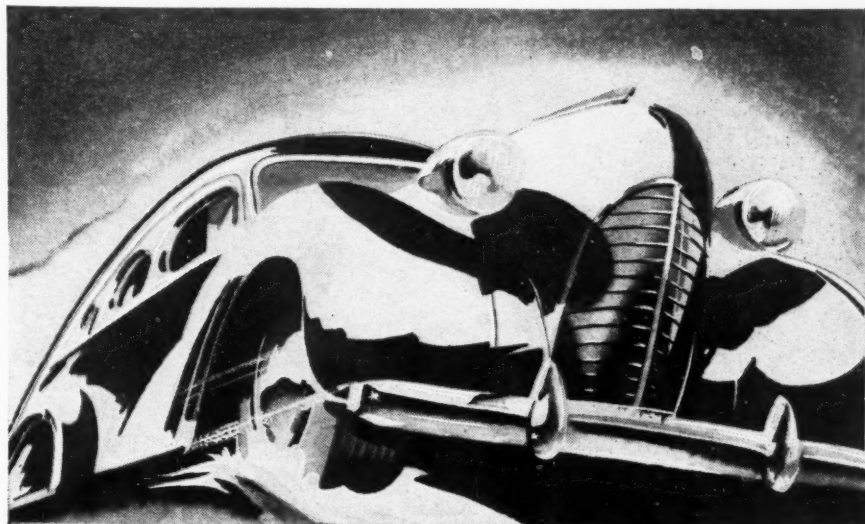
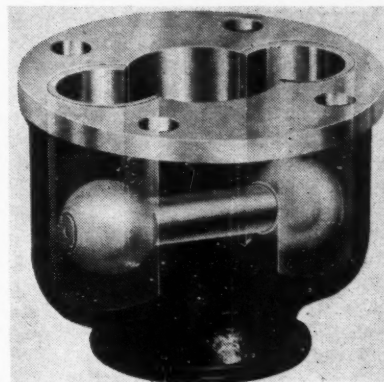
For 30 years Mr. Hecht devoted all of his interests to the development of the replacement parts industry and for many years was actively engaged in work with both the National Standard Parts Association and Motor Equipment Manufacturers Association. The business of the Guaranteed Parts Co. is being continued under the guidance of Marco Hecht, the son of the late president.



"I know how we can get the Spinelli mob out of there—write to Motor Age Clearing House!"

Universal Joint Repair Kit

The Simmons Mfg. Co., Ashland, Ohio, announces a new line of universal joints and repair kits to replace Detroit Ball Type joints in Plymouth, Chrysler, Dodge, Desoto and other cars. The patented feature of these new replacement and repair items is the case hardened insert sleeves which give longer wear and are the means of rebuilding worn joints, according to the manufacturer. The repair kit consists of the case hardened sleeves, new balls and pin, a new gasket and grease retainer.



OUTSTANDING

Performance

McGILL Bearings with Bronze Retainers have cylindrical instead of spherical ball pockets for minimum contact with balls and to prevent them from wearing out of round. Bronze dissipates heat quickly, prevents crystallization. Inner raceway supports retainer—taking load off balls. Such features indicate the value of using McGILL Bearings for replacement use in cars, trucks, tractors and busses.

You'll find McGILL Precision Ball Bearings built for ENDURANCE! Raceways of finest quality high carbon alloy steel insure long, uninterrupted service. Constantly uniform construction simplifies installations. It pays to use McGILL Bearings.

Order from Your Jobber's Stock

McGILL MANUFACTURING CO.

1600 North Lafayette Street

VALPARAISO, IND.

McGILL



BEARINGS

Chrysler

(Continued from page 13)

is available on the last three named models when equipped with overdrive, the latter combination being standard equipment on the Crown Imperial only.

The new models are supplied with or without running boards. High test safety plate glass is standard in all bodies. A large rear window, curved in sedans, straight in coupes, of heat-tempered glass is used. Floors are lower and the roof top is lower. Front doors are fitted with concealed hinges;

rotary door latches are found on all doors.

Power plant specifications are as follows: Royal and Windsor—6-cyl., L-head, 3½ in. bore x 4½ in. stroke, 242 cu. in. displacement, rated 108 hp. at 3600 r.p.m., with cast iron heads, 6.5 to 1 compression ratio. Horsepower rating on this engine is up 8 hp. over last year due to the adoption of a new high lift camshaft.

Traveler, Saratoga and New Yorker models all use the same engine—8-cyl. L-head, 3¼ in. bore x 4¾ in. stroke, 324 cu. in. displacement, rated 135 hp. at 3400 r.p.m. with a standard cast iron head and 6.8 to 1 compression ratio. A special aluminum head

with a compression ratio of 7.45 to 1 enables these engines to develop 143 hp. The Crown Imperial powerplant is the same as those of the three above mentioned models except that it has a standard aluminum head with a 6.8 to 1 ratio compression and develops 135 hp. It develops 143 hp. with a special aluminum head with a 7.45 to 1 compression ratio, which also is available.

Due to the adoption of sealed beam headlamps generator capacity has been boosted to 35 amp. with full voltage-current regulation. A new high-efficient edge type fuel filter is mounted in the fuel pump.

Transmission cases have the control lever coming out of the side. There is no exposed control tube. Shifting is controlled by a new column-mounted shift lever. This lever is a plastic molding molded over a steel insert. It is supplied in colors to harmonize with the interior trim treatment. Ease of shifting is afforded by the use of new synchronizers and special pointing of first and reverse gears. Face width of first and reverse gears has been increased to provide greater strength.

Many improvements have been effected in the mechanical units of the line. Frames are new and lower with large front cross-members and sturdy X-member contributing to strength and rigidity. Front end suspension has been improved by providing a stronger mounting for the upper control arms and changing the angularity of control arms.

Steering has been improved by liberal use of anti-friction bearings in the steering gear, by the use of roller bearings on king pins, and ball king pin thrust bearings. Direct steering connection with individual tie-rods to each wheel is employed on all models. Rubber insulation is carried as on the 1939 cars, between the frame and steering housing on the Royal and Windsor models. A rubber biscuit same as 1939 in the Pitman arm prevents road shocks from reaching the steering wheel, on the Traveler, New Yorker, Saratoga and Crown Imperial.

The hypoid rear axle on the Crown Imperial is new and incorporates a barrel type differential case which permits the use of large diameter differential gears, contributing to longer life. Total weight of the new axle is less than that of the former model, thus resulting in a reduction in unsprung weight.

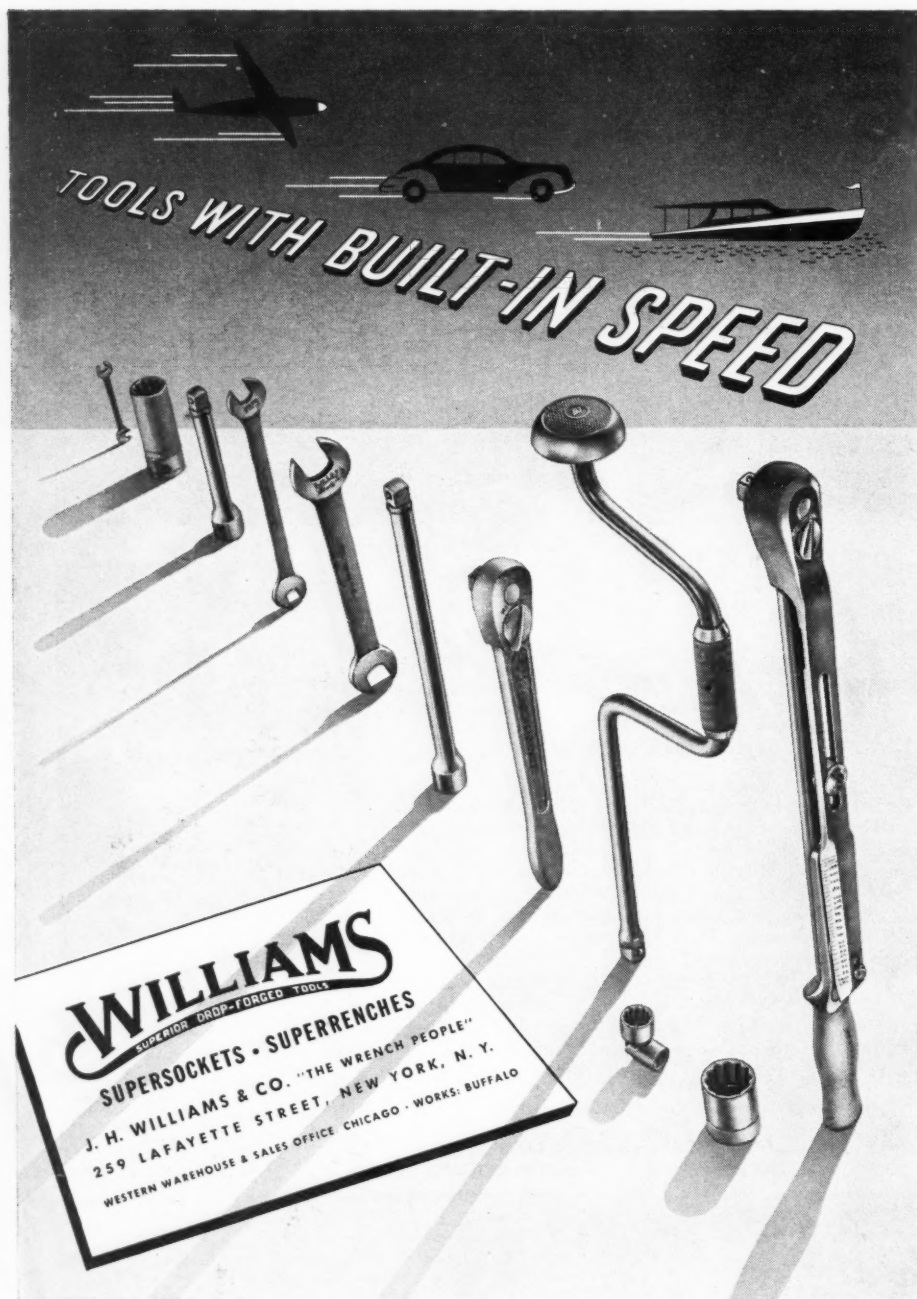
A new rear axle seal has been added on all models to prevent entry of grease to brake linings. Cross type roller bearing universal joints with four sets of rollers in each joint are fitted on all models. Distribution of braking effort between the front and rear has been changed in accordance with the new system of weight distribution of the car. Two-cylinder type hydraulic brakes with two cylinder shoes are found on the Traveler, New Yorker, Saratoga, and Crown Imperial.

Plymouth

(Continued from page 18)

Brake drums are superfinished, and the brake linings are ground to a high finish.

The transmission now has its cover located on the side instead of on top,



which permits of a lower floor in the driver's compartment. Column-mounted shift levers are standard on all models. The remote-control mechanism has been improved, and the shift lever now has a shorter throw. A feature of the new transmission is an improved blocker mechanism. The clutch this year has a lighter driven disc, and there are big ventilating outlets in the clutch housing.

Offered as optional equipment this year is a twin-unit all-weather "Air-control" system. Fresh air from outside the car is filtered and heated, and then distributed through the interior of the car through suitable ducts. Seven different adjustments are possible with this system, which is claimed to provide equal comfort for front and rear-seat passengers.

Advertising

(Continued from page 32)

would be lost and the cost would be much higher. For instance, if we sent out direct mail advertising ourselves the cost of postage alone would be \$50 to reach 5000 people at 1c. and \$100 at first class rates.

"In this way we give people something they need—a handy directory of their own neighborhood, of business and professional men, and we got one cleaner and dyer, one druggist, one grocer, one restaurant, one liquor store, one retail baker, one beauty shop, one hardware merchant, one radio service man and dealer, one plumber and a printer to go in with us on the deal which made it cost us \$7 each."

Sherwin-Williams Appointment

Announcement has been made by K. H. Wood, director of sales of The Sherwin-Williams Co. of the appointment of George E. Smith as eastern manager of automotive sales with headquarters in Philadelphia. Mr. Smith will supervise this work in South Atlantic, North Atlantic and New England districts. This appointment is in line with the company's new specialization program, putting highly trained technical men in charge of its industrial sales by zones.

Commemorate First

Gasoline Tractor

Ceremonies at the little village of Froelich, Iowa, recently, marked the unveiling of a granite monument and bronze plate commemorating the invention by John Froelich in 1892, in that village, of the first practical gasoline tractor with both forward and reverse speeds.

John Froelich was of an inventive turn. While operating a straw-burning steam threshing outfit in South Dakota, he noted the difficulty of maintaining steam during high winds and the corroding effect of the region's alkali water on the boiler.

Upon return to his elevator and feed mill at Froelich, he experimented with the problem of developing a traction power unit which would function in any weather and be free from the trouble of hauling water. Going to Cincinnati, Froelich purchased a Van Dusen stationary gas engine of one cylinder with 14-in. bore and 14 in. stroke. This engine was placed on

wooden beams mounted on a steam running gear. Steam engine parts such as shafting, gears and pulleys were utilized to augment special parts designed and cast by Froelich and his helper, Will Mann.

After many adjustments the cumbersome model chugged slowly out of the shop and down the road where a neighbor was threshing. It worked. Later this tractor was shipped to Langford, South Dakota, in the fall of 1892, and for more than 50 days successfully operated a 40 by 60 threshing machine.

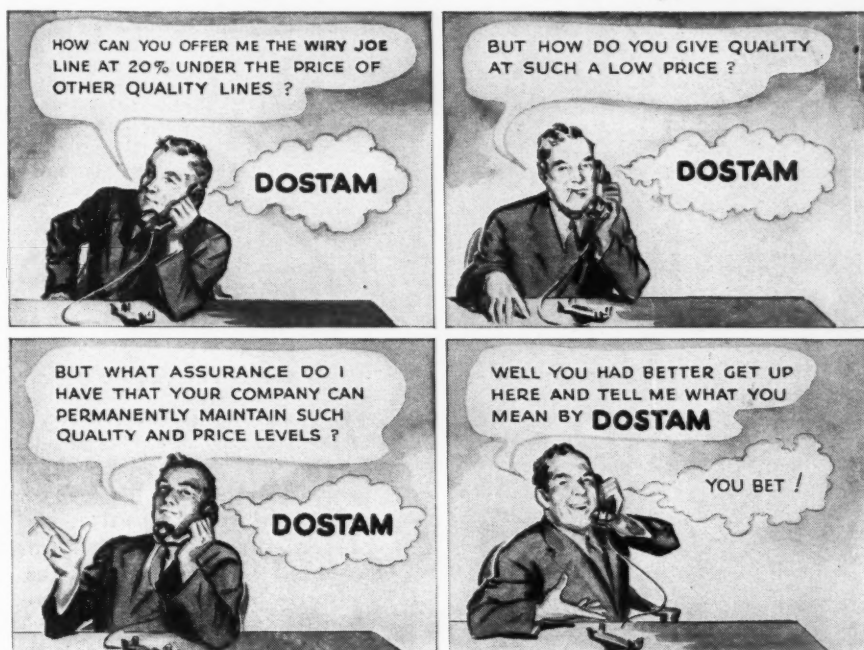
In 1893 John Froelich organized the Waterloo Gasoline Traction Engine Co. of Waterloo, Iowa. The com-

pany met with many reverses in those early years before finally placing a practical tractor on the market under the trade name of "Waterloo Boy." The John Deere Co. absorbed the Waterloo concern in 1918.

John Froelich, the inventor, realized little financially out of his venture and received scant recognition during his lifetime. He spent his last years in St. Paul, where he died May 23, 1933.

The monument and marker, standing on a grassy terrace, were planned and completed by villagers and farmers of the community as a tribute to their friend, who gave them their first workable gasoline tractor.

He learned about wire by wire!



The DOSTAM METHOD employs new management principles . . .

higher wages paid to direct labor . . . management economies . . . the elimination of top-heavy executive expense . . . the reduction of selling costs and complete control of all manufacturing operations.

Through the balanced application of these principles, real economies are effected that make it possible to offer the Wiry Joe Line at prices which consistently average 20% under the price of other well-known quality products.

As the largest independent producer of automotive wiring for the replacement field, the Crescent Com-

pany offers completeness of line with quality and price that cannot be equalled. The sooner you take on the Wiry Joe Line, the sooner your business will show an increased profit on automotive wiring sales.

This advertisement is appearing in all leading trade publications this month.

Wiry Joe **AUTOMOTIVE WIRING**
is produced under the

DOSTAM METHOD



THE CRESCENT COMPANY *Auto Cable*

Pawtucket, Rhode Island, U. S. A.
Montreal, Canada

LEGALLY SPEAKING

by C. R. ROSENBERG, JR.

A lawyer's interpretation of Federal and local court decisions of interest to repairmen, presented each month

Statements of Value

SOMETIMES a salesman in his enthusiasm will state that the thing he is trying to sell has a value far in excess of the selling price. If a repairman buys on the strength of such

a statement and the goods turn out not to have the value represented, may he obtain legal redress for the deceit from the salesman or his employer? Ordinarily not, according to a recent decision of the Supreme Court of Pennsylvania.

"Statements of value," says the Court, "are but a part of the trade talk and bargaining which customarily accompany negotiations for the sale of property. It has many times been pointed out that a buyer or seller is not entitled to rely on such statements where he has an equal opportunity to ascertain the facts affecting the value of the thing to be sold."

A somewhat similar situation arises where a person soliciting the signing of a contract or other document states that the paper is not legally binding. Such representations of legal matters, even though they turn out to be false, do not constitute the basis of an action for fraud or damage on the part of the repairman deceived by them.

"Fraud cannot be predicated upon representations of matters of law," says a Federal Court in a recent case. "A misrepresentation as to a matter of law is ordinarily to be regarded as merely an expression of opinion and will not support an action for fraud or deceit. However, when one has used superior knowledge or information to obtain an unconscientious advantage over another who is confessedly ignorant, a misrepresentation in respect of a matter of law may be actionable."

Best safeguard for a repairman is to submit a proposed contract or other document to an attorney before signing it.

Picketing by Consumers

IN a labor dispute may an organization of consumers lawfully picket the employer's place of business, especially after picketing by the union has been enjoined by the Court?

In New Jersey recently the Court restrained a union from picketing a store. Thereafter a consumers' organization picketed the place and distributed to prospective customers and passersby handbills urging a boycott of the store and alleging that the store was anti-union. The store sought the protection of the Court, which issued an injunction restraining the consumers' organization from picketing.

"The avowed purpose of the consumers' organization in picketing the store and distributing the handbills," the Court pointed out, "is to induce or compel the store owner to accept the demands of the union and by the same method to persuade or induce other persons not to deal with the store. This is unlawful and constitutes secondary boycott."

Help for Simple Soul

USUALLY it is difficult to get out of a contract once signed or a deal once made, but the law will help an ignorant, trusting person who has been imposed upon by a sharper.

The Supreme Court of Nebraska recently put it this way:

"While it is not the function of the courts to make contracts for parties, or to relieve them from the effects of bad bargains, nevertheless where the

Again "ENGINEERED to Compensate for Wear"

Creates New Profit-Builders!



"Guaranteed" Headlight Relays

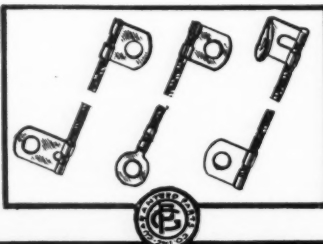
Again "Guaranteed" marches forward in its pioneer work of re-designing all ignition replacements for plus-value service. Now it's Headlight Relays—"engineered to compensate for wear!"

They are insurance against accidents—most frequent in night driving—by acting as a step-up and developing greater candle power. They compensate for the resistance of the wires and switches—compensate for the wear that occurs in reflectors and wire assemblies.

And again "Guaranteed" provides sure-fire selling help—a big, powerful display, free with your order for 4 "Guaranteed" Headlight Relays! Ask for No. LR-100.

"Guaranteed" Connector and Ground Leads

Greatest cause of trouble in ignition systems is broken distributor lead wires. "Guaranteed" completes its line with a full range of "engineered" Connector and Ground Leads to fit Auto-Lite and Delco-Remy distributors—re-designed to compensate for wear: extra sturdy, durable, dependable! Specify "Guaranteed", and write for profit-details on the "modernized ignition".



GUARANTEED PARTS CO., Inc. • Seneca Falls, N.Y.

ORIGINATORS OF THE WELL-KNOWN "FOUR STAR" LINE

simplicity and credulity of people are taken advantage of by the shrewdness, over-reaching and misrepresentations of those with whom they are dealing, and they are thereby induced to do unwittingly, something the effect of which they did not intend, foresee, or comprehend and which, if permitted to conclude, would be shocking to equity and good conscience, a court may with propriety interpose.

"Equity will not refuse to set aside a contract when it plainly appears that one party over-reached the other and gained an undeserved advantage which it would be inequitable and unrighteous to permit him to enforce, although the victim owes his predicament largely to his own stupidity and carelessness."

License Fee at Cost

WHEN a city or other municipality charges a license fee to regulate a business activity within its boundaries, the license is not supposed to be a money-making proposition. Primarily, the license fees are supposed to finance the cost of the regulation for which the license is designed.

"The license fee should bear a reasonable relation to the cost of regulation," the Supreme Court of Illinois recently pointed out.

In a case involving the licensing of vending machines the same court sustained an ordinance imposing a larger license fee for one type of machine than for another type. The court felt that such a classification was not unreasonable since there might be some differences in the cost of inspecting and regulating the two types of machines. A curious feature of this case was that the license fee for operating a store was three dollars, while the license fee for each vending machine was also three dollars, even though several machines might be located in the same room.

Pay for Destroyed Goods

A REPAIRMAN buying equipment on time payments under a conditional sale contract may meet with a disastrous situation if the goods should be destroyed. According to a recent Indiana court decision, the repairman would have to pay the full price for the equipment regardless of its destruction.

"Where goods are sold and delivered to the buyer on a conditional contract of sale," says the court, "the loss or destruction of the property while in the possession of the buyer does not relieve him of the obligation to pay the price and thereafter the buyer suffers the loss."

Pointing out that the buyer may be able to get back his money from the person who may have been responsible for the destruction of the goods, the court continues:

"The conditional buyer has the right to recover the full measure of

damages occasioned by the injury to or loss of the subject matter of the sale, but he is not relieved from his obligation to pay the full purchase price agreed upon even though the property be lost or destroyed."

No Tax by Gross Volume

TAXES on chain stores and other enterprises must keep within constitutional and reasonable limitations if they are to be valid, as the Supreme Court of Minnesota recently pointed out.

There a tax statute divided chain store merchants into eleven different

classes based upon their volume of gross sales and imposed a different rate upon every such class. Thereafter a chain store organization brought an action to recover taxes which it had paid the state under this statute under protest. The Court ruled that the tax as imposed on gross sales was not a proper one and said:

"The classification divides the chain stores into eleven classes and bases the rate of taxation upon the volume of gross sales, a different rate being applied to each class. Does this classification rest upon any ground hav-

(Continued on next page)

THE BIGGEST NEWS IN STEERING ALINEMENT

*Never Before a Machine
Like This For So Low a Price!*

Does everything in front end alinement to exact manufacturer's specifications. Includes Bear Alinement Rack equipped with latest type automatic front-end testing devices—knee action and axle correction equipment. Handles either conventional axle or individual suspension! Absolutely accurate. Built to last a lifetime! Quicker to operate—easier to operate! Bear precision and quality through and through. Its sensational new low price brings a high quality Front End Alinement Service Unit within the means of every shop!

NOW only \$50 DOWN

gets you started in the Big Profit Steering Alinement Business with an outfit that has the whole industry talking!



THE
MOST
IMPORTANT
COUPON
YOU
EVER
MAILED

BEAR
MFG. CO.

Rock Island, Illinois

SHOW ME HOW the new low priced Bear 110-80 Front End Service Unit can get me started in Big Profit Steering Alinement Service for only \$50.00 down.

Name _____

Address _____

City _____

State _____

Legally Speaking

(Continued from preceding page)

ing a rational relation to the subject of the enactment?

"The only base is the volume of sales, not whether the result is a profit or loss. The statute operates to take as the tax a percentage of each dollar due or paid upon every sale, but increases the percentage if the sale which is the occasion of the tax succeeds the consummation of other sales of a specified aggregate amount. It is a tax upon gross receipts and as

such affects every transaction in proportion to its magnitude and irrespective of whether it is profitable or otherwise."

The Court concluded that the imposition of varying rates of taxation according to the eleven classifications by gross sales volume was so unreasonable and arbitrary as to render the enactment void. Such a tax would be similar to a tax of 1 per cent on repairmen grossing \$1,000 a week, 2 per cent on those grossing \$2,000 a week, and so on.

In tax matters, as well as other things, every business man and or-

ganization is under the Federal constitution entitled to the equal protection of the laws of the state in which he or it is located. The general rule of taxation is that taxes shall be uniform upon the same class of subjects.

How Long for Complaint?

WHEN goods or equipment are unsatisfactory or turn out to be defective in actual use, the repairman should make his complaint promptly if he expects the law to help him. Certainly he puts himself in a doubtful position if he continues to use the goods and complains of them only when sued for the purchase price.

In a recent Michigan case a purchaser had retained and used certain equipment for four years when he was sued for the contract price. He still had it and apparently was using it when the suit came before the trial court four years later. Despite this, the seller's suit for the contract price was rejected by the Court. The higher court reinstated the suit, however, saying that it was "error" under the circumstances to say that the seller was not entitled to recover any portion of the contract price after the goods had been used for eight years.

Law and equity, according to an old maxim, "Help the vigilant and not the slothful and will not aid those who slumber on their rights."

Sure of Insurance?

A REPAIRMAN who has a policy of automobile or other insurance may find that he has no insurance at all. That is what happened recently in Ohio.

There an automobile liability policy lapsed and the holder applied to have it reinstated. The insurance company's local agent gave him a receipt for the application and noted thereon the word "reinstated." Thereafter the policyholder had an automobile accident, but discovered that he was not protected by the reinstated policy. The local agent had no authority to reinstate the policy because all applications were subject to acceptance at the insurance company's home office. The accident occurred before the home office had accepted the reinstatement application.

Good idea for repairman to check his insurance policies to see that they are duly executed by the proper officials of the insurance company. Not all local insurance agents have the authority to execute and sign policies for the company.

Financing Employee's Fight

DELIVERING a swift right to the jaw of someone he dislikes may bring joy to an employee's heart, but

So they won't talk, eh?

listen to these successful Service Men



I've found out that just ONE worn bearing can hang the crepe on an otherwise perfect job.



You're right, friend! — Bearings hold vital parts in alignment — and if you turn a job out with bum bearings, you'll soon have trouble on your hands!



Check! I make it a rule to inspect bearings on every overhaul. It doesn't cost my customers much to replace worn ball bearings under the Ahlberg Ground Bearing exchange plan.

The Sign of the Bearing Specialist Your Authorized Ahlberg Wholesaler.



Any driver will admit that his car needs good oil, good grease. But does he often think how much his car needs perfectly conditioned bearings?

Probably not ... but BEARINGS are the joints of his automobile — they must function smoothly or he will have "highway-arthritis."

You can help your customer by checking his bearings on every overhaul job — as well as brake linings, ring gears, pinions, etc. — And your Authorized Ahlberg Jobber will deliver every first-quality bearing you need, when you need it, — Ball, Thrust and the famous **Micro-Honed Bower Tapered Roller Bearings**. He can also give you economical Ahlberg Ground Ball Bearing exchange service — (you exchange sound worn ball bearings for reconditioned bearings with a **NEW bearing GUARANTEE**).

Every Type of Bearing You Need
When You Need It—from
your Jobber

AHLBERG BEARING COMPANY

Manufacturers of CJB Master Ball Bearings
3028 W. 47th Street, Chicago, Ill.

34 WAREHOUSE BRANCHES

Out West its **PRECISION BEARINGS, INC.** Los Angeles

the repairman who employs him may under some conditions have to pay for it. In a recent Indiana case an employe of a business house administered a severe beating to an applicant for employment. The applicant sued the employer for his injuries and got a verdict of \$2,000 which was sustained by the court.

The employer was held liable because, believe it or not, the employe was considered to have beaten the man "in the course of his employment."

"If the act is done within the general scope of employment," explained the court, "and is wrongful, the employer is liable, although the act is unnecessary to the performance of the employer's service and was not intended for that purpose."

In cases of this kind the question as to whether or not the wrongful act of the employe was committed within the general scope of his employment is ordinarily determined by the jury. If the jury decides that the injuries inflicted by an employe were done in the course of his employment, the employer pays.

No Salary for Partner

A PARTNER'S only "take" is his share of the profits of the partnership business. Unless he has a definite agreement with the other partners, he gets no salary for his services in the business. In a suit by a partner for compensation for services rendered by him to the partnership, the Court of Appeals of Kentucky recently said:

"We find no merit in his claim for salary against the co-partnership. The proof does not show an express agreement that he was to receive any salary from the co-partnership, nor do the facts and circumstances create the implication that such an understanding existed to this effect between him and the other partners. In the absence of such express contract or facts creating such implication, a partner cannot recover salary or compensation, even though he had control of the business and performed the major portion of the work."

Most partners settle this question by agreement among themselves. Sometimes they agree that each partner shall be paid a stipulated salary. Another plan is to allow each partner a weekly or monthly "draw" against his account; thus at the end of each fiscal period his total "draw" for the period is deducted from his share of the profits.

"Palming Off" Substitutes

NATIONAL advertising of branded merchandise has pretty well done away with the old trick of "palming off" on customers inferior or at least different goods. Here and there, however, substitution seems to be practiced as is evidenced by a recent

case brought up in Illinois.

There a wholesale distributor of certain branded products brought action against a retailer to stop the retailer's alleged unfair competition. The evidence was that when the distributor's branded products were called for, the retailer "palmed off" other items as those of the distributor. This, the Court felt, was unfair competition even though the retailer sold to the general public while the distributor sold only to retailers.

"The legal doctrine of unfair competition," said the Court, "is a development of the idea that it is

against public policy that the goods of one person should be offered for sale or sold as those of another."

"Palming off" in the legal sense is the substituting of other goods in the place of those asked for by the customer without informing the customer of the substitution. This would apply to repair or replacement items where the customer has asked for the items by their brand names and thinks he is getting them. Of course, there is no legal or moral objection to a repairman endeavoring to get his customer to buy a different brand or item.

Compare 'em all - - and we are sure you'll agree that

YOU CAN'T BEAT THIS

O'BOY—It's built right—and it's priced right!

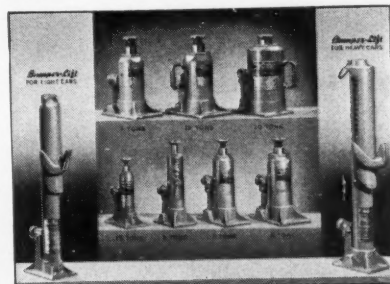


O'BOY—it's a great value... Ideal for tire service . . . curb service . . . shop service . . . This popular service jack has 2,500 lb. capacity . . . Raises to 17½"—high enough to change tires on any passenger car . . . Weighs 60 lbs. . . . Packed complete in carton.

COMPLETE H-W LINE includes Bumper-Lifts for modern passenger cars . . . 1½ ton, 2, 3, 5, 8, 12 and 20 ton capacity Hand Jacks for trucks . . . Also 1½, 2, 3 and 4 ton capacity Service Jacks.

Ask your jobber for details—or write us

HEIN-WERNER MOTOR PARTS CORP.
Waukesha, Wisconsin



FEW MODELS ENGINEERED TO DO THE WORK OF MANY
HEIN-WERNER
hydraulic JACKS

Auto Show Set For Gala Opening

When the doors open on Sunday, Oct. 15, the Fortieth Anniversary National Automobile Show gets under way, officially presenting to the motoring public the cars they will drive during the coming year.

The Grand Central Palace has been transformed into a Greek Temple for the occasion, with the simplicity and charm of ancient Greece forming the background for display of the modern new cars. All the large columns in the center court and around the walls have been transformed into Doric. The familiar name-signs are silver

shields, and rubies are everywhere. Large murals, 8 ft. by 37 ft., on four sides of the building, depict the development of passenger transport from the earliest times through the horseless carriage and bumpy old stagecoach days, down to the smooth, comfortable, effortless driving of today's modern motor car.

On the main floor and the mezzanine will be displayed the last word in passenger car development. Sleek, new cars with improvements in appearance, style, safety and comfort little dreamed of a few years ago, and with performance to match that of the streamlined train and skyway cruiser.

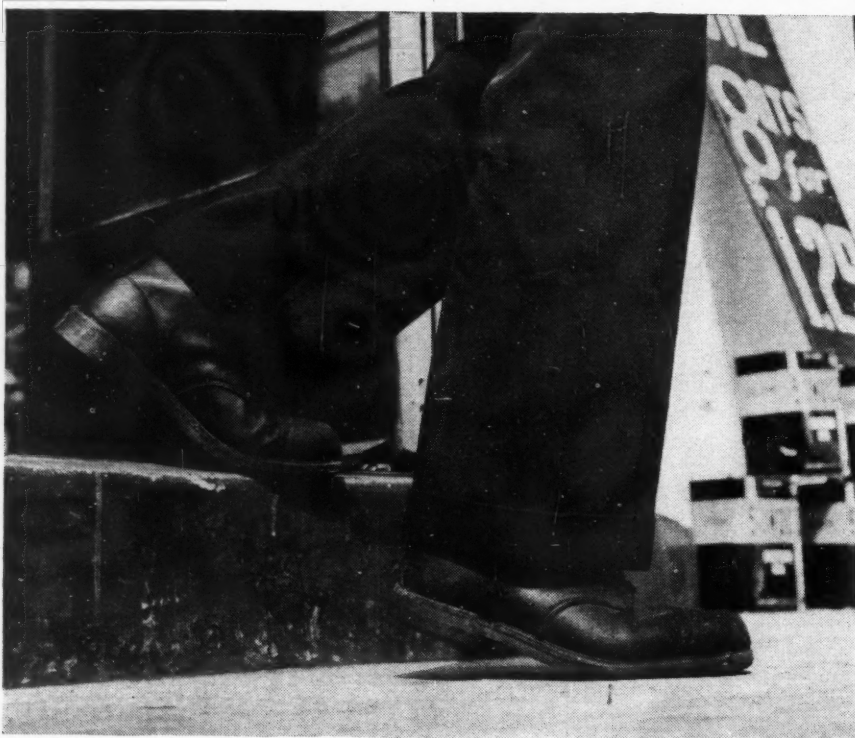
On the upper floors will be found

displays of commercial units in station wagon, panel delivery and pickup models, with heavy units of Diesel engines occupying a generous part of the space.

The fourth floor has been given over to the Highway Safety Theme Center, where interest is centered on the new sealed beam headlighting system. Lectures and demonstrations will be given, comparing the new type with the old. There will be dramatic action exhibits by numerous national and metropolitan organizations engaged in highway safety promotion. In addition there will be exhibits by groups that are allied with the automobile industry, such as the rubber manufacturers and others, showing the engineering advancement toward the inherent safety of motor vehicles.

General admission has been reduced to forty cents for either afternoon or evening, following through with the "more-for-your-money" policy so strongly represented in the automobile of today.

FOLLOW THIS MAN



*he's taking a step
in the right direction!*

THE MAN in the picture is stepping out in some remarkable shoes—though maybe you wouldn't guess it from looking at them.

These shoes will last *many times longer* than ordinary work shoes. Why? Because the soles and heels are made of *neoprene*.

Neoprene soles and heels look like rubber. They have "spring" like rubber. But here's the big, money-saving difference: neoprene soles and heels, unlike rubber or leather, stand scuffing on the concrete apron *even when they are soaked with oil and grease from the lubrication pit!*

More and more service station men are turning to neoprene and you can bet they're cutting shoe bills way down. Follow their example. Ask for neoprene soles and heels when you order your next pair of work shoes from your regular supplier.

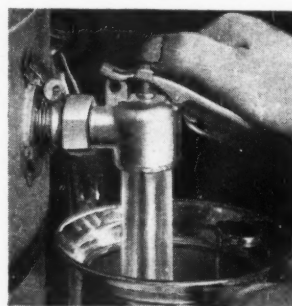


NEOPRENE

E. I. DU PONT DE NEMOURS & CO. (INC.), RUBBER CHEMICALS DIVISION, WILMINGTON, DELAWARE

Oildrum Faucet

The Imperial Brass Mfg. Co., 1200 W. Harrison St., Chicago, Ill., has introduced a new oildrum faucet known as "Molygate." The faucet operates by pressing down on the handle which releases a spring-loaded



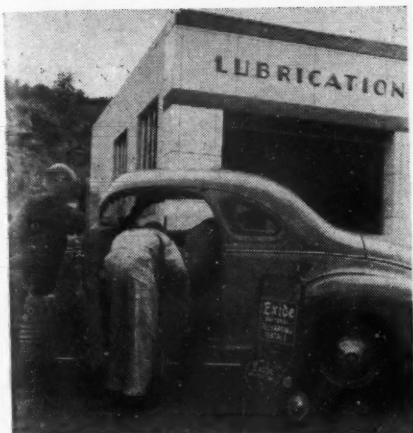
valve, allowing full flow. When the handle is released the valve closes instantly, preventing dripping. An outstanding feature of this new faucet is its neoprene seat vulcanized into the valve head. It is available in 1/4 in. and 1 in. sizes. Prices range from \$1.10 to \$1.35.

Oil Filter Fittings

A simplified line of packaged fittings for installing oil filters easily and quickly on automobile, truck, bus and tractor engines has been introduced by the AC Spark Plug Division of General Motors, Flint, Mich. Seven kits will cover all passenger cars, and one kit contains all fittings to install an AC filter on practically any make or model of truck, bus or tractor. The only exception to this is cab-over-engine trucks, for which two conversion kits are available.

Gasket Assortment

A neat and very practical cabinet assortment of oil seals is being supplied by the Victor Mfg. & Gasket Co., 5750 W. Roosevelt Blvd., Chicago, Ill. While the cabinet is adaptable to any assortment, the selection supplied is made up of seals for Chevrolet, Ford and Plymouth cars.



The Exide Service Buggy, a handy piece of shop equipment, has a place for the service battery and the battery service kit. The back panel advertises rental and recharging of batteries, and is finished in black and Exide orange. All joints are welded making a sturdy outfit. Sells for \$4.35 net. The Electric Storage Battery Co., Philadelphia, Pa.

Lou Meyer Retires

Lou Meyer, the "Flying Dutchman" of the speedways, has announced his retirement from active racing to become head of an engine reconditioning plant which he is establishing on the West Coast for Ford Motor Co.

The plant represents an investment of \$150,000 supplied by Meyer, Ford, and by several of Meyer's fans and well-wishers. Listed among the investors is Robert M. Bowes, his late racing sponsor.

The well-known Meyer-Bowes racing combination will continue with Meyer having charge of the job of readying the Bowes "Seal-Fast" entry for speedway competition.

A New Method of Highway Lighting

A new method of road lighting has been under test in England for some time. In that country road surfaces often gleam when wet from rain, and it occurred to some of the lighting experts that under such conditions obstacles and persons in the road would be outlined better if the rays were directed against on-coming traffic. The vehicles then move toward the light and obstacles show the driver only their non-illuminated side, so that the silhouette effect is stronger.

The system is under test on a section of the Great Chertsey Road at Twickenham in the vicinity of London. This is a wide avenue divided by a central grassy walk with a central line of trees that are still quite small. On one side of the road lamps were installed along the edge of the central walk and the sidewalk, and aimed in the direction of oncoming traffic. This method of illumination gave the most satisfactory results from the safety standpoint. Comparisons could easily be made with the opposite side of the road, where the lamps were arranged in the usual way, throwing equal amounts of light

in both directions. With the new arrangement it has been possible to replace the 400-watt lamps previously used by 250-watt lamps, thereby reducing the cost of illumination by almost one-half, while the actual visibility is increased.

Oil from Way Down

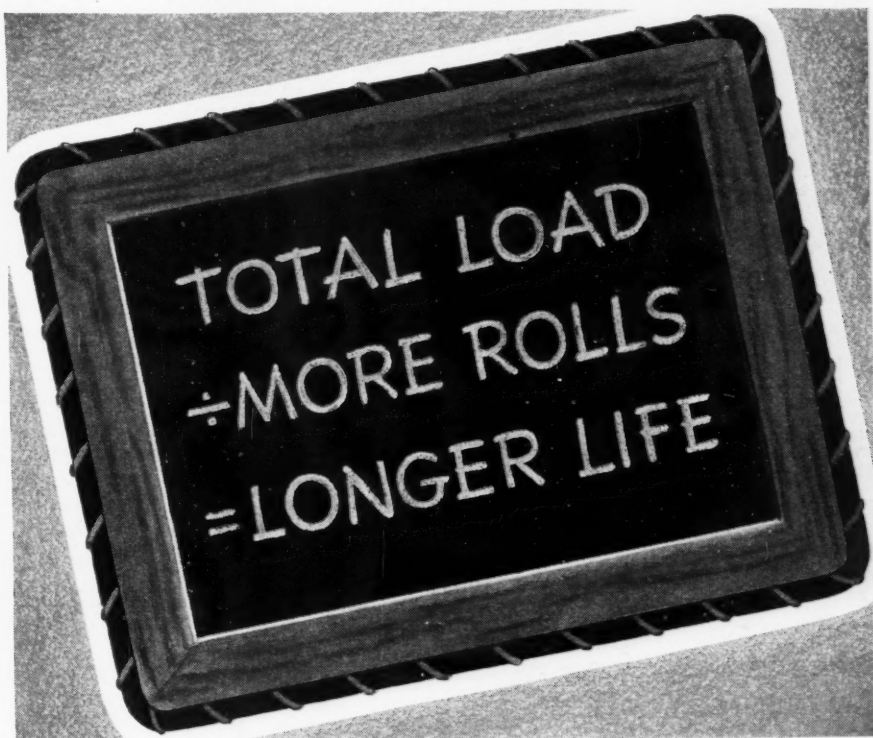
Accuracy of modern oil prospecting has led to the discovery 10,000 to 13,000 feet below the earth's surface, of 25 new oil fields. All have been proven productive within the last 2½ years.

Ten years ago oil-bearing rocks seldom were "mapped" deeper than

9,000 feet. Today seismograph recordings of structures at 13,000 to 15,000 feet are routine procedure; some have reached 25,000 feet.

Similarly, drilling depths nearly have doubled within the last 12 years. The 8000-foot drilling record of 1927 has been increased by 7000 feet. The past 1½ years alone have been outstanding, adding nearly 3000 feet to depth records as the drill reached 13,000, 14,000 and 15,000 feet for the first time.

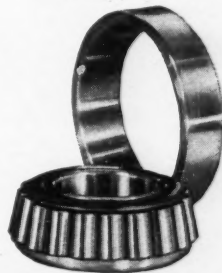
Of the 312 wells that have been drilled below 10,000 feet since that level first was reached eight years ago, 246 or 80 per cent have been made in the last 18 months.



● Tyson eliminates the cage of the conventional cage-type tapered roller bearing, and fills the in-between spaces with additional load-carrying rolls.

Naturally, more rolls mean more capacity. And, since each individual roll has proportionately less load to carry, bearing life is doubled.

Simple arithmetic proves that Tyson Cageless is a Better Bearing.



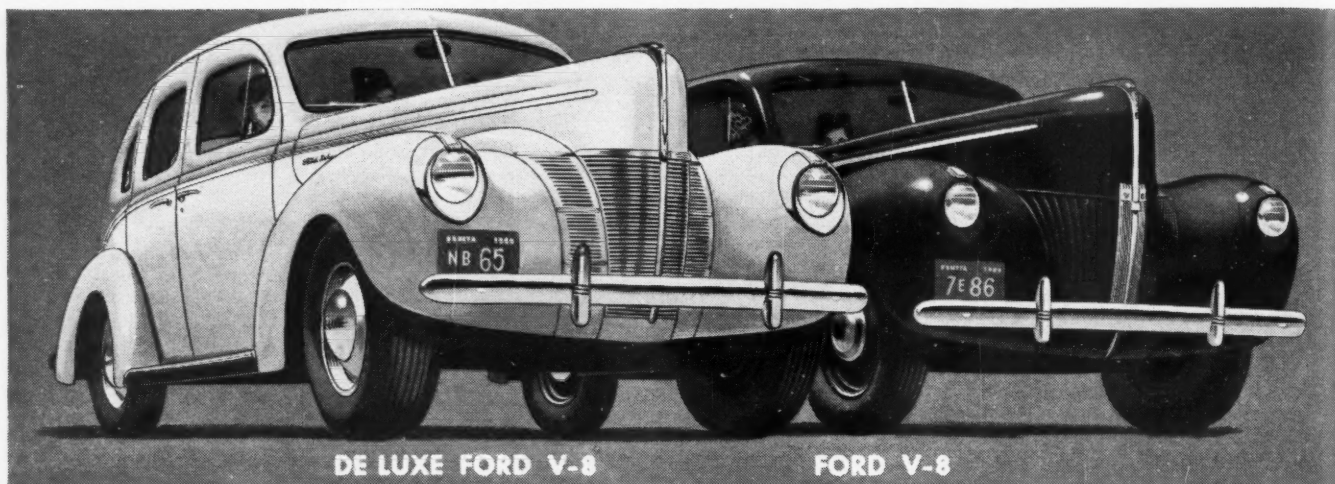
TYSON CAGELESS BEARING

Cageless FOR HARD SERVICE Cage-type FOR REGULAR SERVICE

Tyson

TYSON ROLLER BEARING CORPORATION, MASSILLON, OHIO

For 1940...Here Are the Ford, Mercury and



FORD V-8

22 Important Improvements

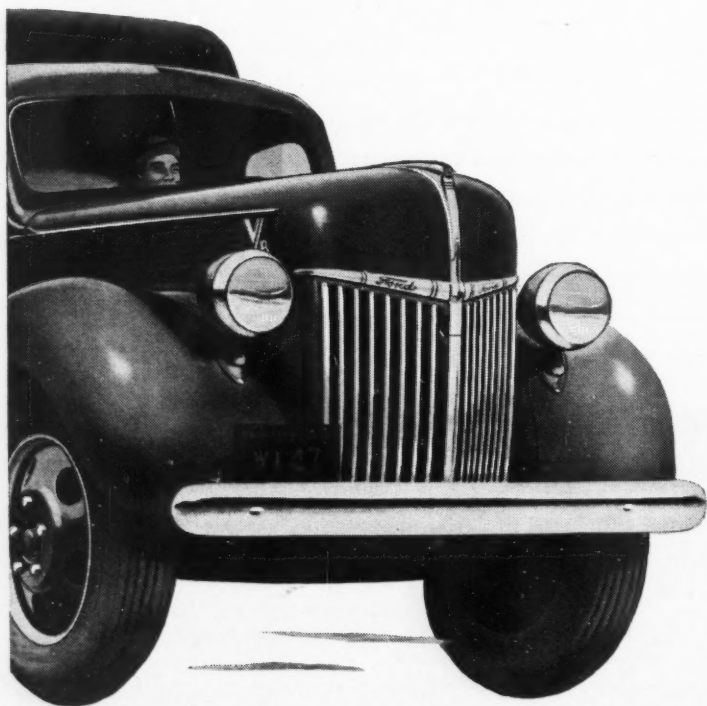
Into the new Ford cars for 1940 are built 22 important improvements. The 1940 Ford cars are not only more beautifully styled than ever before, but roomier, quieter, more comfortable.

There is a Finger-Tip Gearshift on the steering post. New Controlled Ventilation. Improved shock absorbers and *spring suspension—all contributing to increased comfort.

*85-hp models only

The 1940 cars have new Sealed-Beam Headlamps. They have big powerful hydraulic brakes. And they have the famous Ford V-8 engine (85 hp in the De Luxe Ford. Choice of 85 or 60 hp in the Ford)—which blends 8-cylinder smoothness with economy.

Ford cars have always been built to give good service at low cost. For 1940 they represent a better buy than ever before.



FORD V-8 TRUCK

Outstanding Truck for the Money

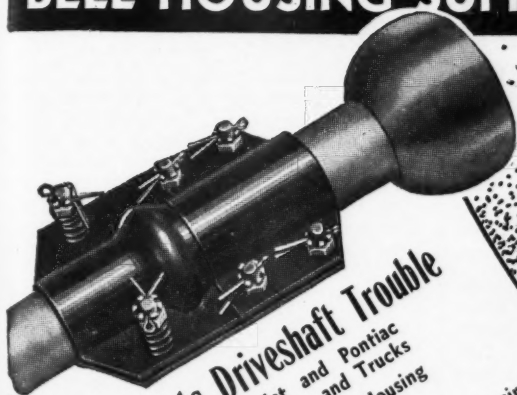
Dollar for dollar, unit for unit, the 1940 Ford Truck line is outstanding in mechanical quality. Outstanding in performance and economy.

The Ford offers the advantages of a V-type 8-cylinder engine, and a choice of three superb power-plants—95, 85 and 60 hp—to match the engine to the job. Never before has the Ford Truck line included so many wheelbases, body types, chassis sizes.

There are many new features. Extensive chassis changes that mean greater accessibility to both engine and chassis. New cab construction. Increased driver comfort. New Sealed-Beam Headlamps on all units. These improvements, and many more, are added to a host of time-proved quality Ford features.

A comparison, feature by feature, with other trucks at any price—or an actual “on-the-job” test—will show why Ford is the “outstanding truck for the money.”

PEE-CEE (Patented) 3 PIECE BELL HOUSING SUPPORT



Prevents Driveshaft Trouble
in Chevrolet and Pontiac
Passenger Cars and Trucks

- Easily Assembled on Bell Housing
- Self Lubricating
- Eliminates Binding and Bulging of Shaft
- Prevents Workmanship and Materials
- Guaranteed

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Stamping Co.
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Ashland, Ohio
PARTS MFG. CORP.
309 W. 66th St.
New York City

**WRITE TODAY!
CATALOG
FREE**

PEE-CEE MANUFACTURING CO.
FAIRFIELD ILLINOIS

New! Improved!



1.34 to 134 cu. ft. per min.
20 to 200 lb. pressure
1/4 to 15 horsepower

IMPROVED →

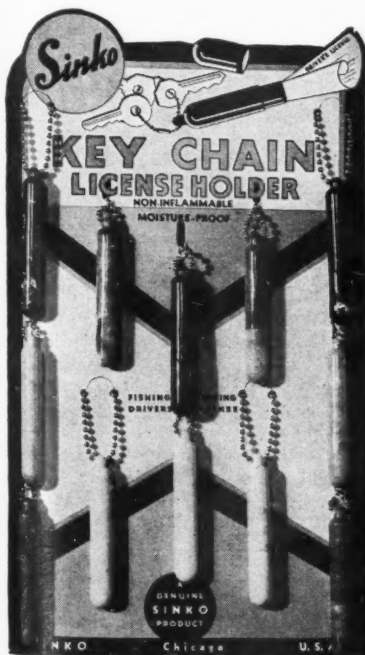
- SAFETY VALVE
- NON-PULSATING NOISELESS CHECK VALVE
- OIL-PROOF, LEAK-PROOF GASKETS
- COOL-OPERATING FINNED DISCHARGE LINE
- SUCTION MUFFLER AND AIR CLEANER
- COMPACT STREAMLINED PLACEMENT AND MOUNTINGS

Every Worthington Compressor is Equipped with
THE FAMOUS WORTHINGTON FEATHER VALVES
(REG. U.S. PAT. OFF.)

• Write for details of the
Worthington Jobber Proposition

WORTHINGTON PUMP AND MACHINERY CORPORATION, HARRISON, NEW JERSEY

WORTHINGTON



NEW A GENUINE Sinko

KEY CHAIN LICENSE HOLDER



15¢
LIST

Utility Tube protects
driver's, hunting and fish-
ing licenses in non-in-
flammable, moisture-
proof case which fits
securely on car key chain.
Pick up some extra
change by selling this
item to your regular cus-
tomers.

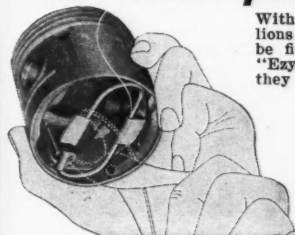
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Name and address identity as an ad-
vertising medium now available. Full
particulars as to quantity, copy, etc.,
will warrant quotation.

Write for catalog

SINKO TOOL & MFG. CO.
351-371 N. Crawford Ave., CHICAGO, U.S.A.

... Millions of Pistons can now be fitted this speedy, easy way!



With a fraction of the labor cost, mil-
lions of pistons like that shown here can
be fitted instantly with the WEL-EVER
"Ezy-Fit" piston skirt expander because
they require.

- No Grooving
- No Slotting
- No Drilling
- No pin or rod removal

Can actually be installed
without pulling pistons!

Installed in a Second!

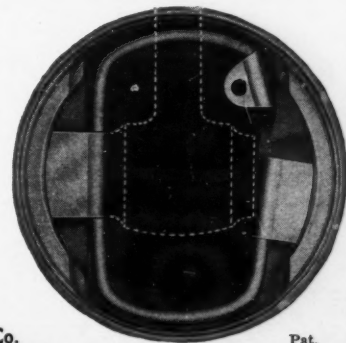
Can't come out in use. Note
pins and eyelets for quick
installation. Insertion Tool
furnished with each Set, free!

**The WEL-EVER
"EZY-FIT"
Skirt Expander**

For Ford V-8 "85" pistons
(alloy) 3 1/16" bore. We
also manufacture a complete
line of Expanders for all cars
... all "EZY-FIT" for hard-
to-fit pistons!

Ask Your Wel-Ever Jobber
—today, for the "EZY-FIT"
skirt Expander. Install in
your next job! Literature on
request.

The Wel-Ever Piston Ring Co.
Factories: Toledo, Ohio, and Windsor, Ont.



Pat.
Pending

WEL-EVER

TRADE MARK

REGISTERED

of Course It Costs Less to Clean Motors! With MAGNUSOL!

COMPARATIVE COSTS MOTOR AND CHASSIS CLEANING

WITH SOLVENTS	WITH MAGNUSOL
2 Gal. GAS and KEROSENE \$ 0.24	1 QT. MAGNUSOL MIX \$ 0.06
35 MINUTES LABOR 0.28	5 MINUTES LABOR 0.04
TOTAL COST \$ 0.52	TOTAL COST \$ 0.10
ONLY FAIR CLEANING JOB MUCH BRUSHING AND SCRAPING.	PERFECT CLEANING NO BRUSHING OR SCRAPING

The comparison at the left, taken from actual records, is typical. But no matter what method you're using now, it will cost you less to clean motors and chassis with Magnusol.

IT GOES FARTHER. You don't pay high prices for the kerosene or other diluents included in ordinary cleaners. Magnusol is a concentrate. You add your own kerosene (and use

less of it, too).

IT WORKS FASTER AND BETTER. You simply spray the Magnusol mix on, let it stand a few minutes, then rinse it off with all the grease and dirt with a pressure hose.

MAGNUSOL IS SAFE.—Harmless to skin, hands, metal and rubber. The mix is non-flammable, too. You don't even have to disconnect the starter when you clean a motor with Magnusol.

Sell motor and chassis cleaning jobs to your customers. With Magnusol, you can make a fine margin of profit.

GIVE IT A TRIAL

Order a trial drum. Use it. See if it does not do a better, more economical job. If you are not satisfied after 30 days, send back the unused portion for full credit on the entire drum.

MAGNUS CHEMICAL COMPANY

Manufacturers of Cleaning Materials, Industrial Soaps, Metallic Soaps, Sulfonated Oils, Emulsified Agents and Metal Working Lubricants.

178 South Avenue

Garwood, N. J.



MAGNUS CLEANERS

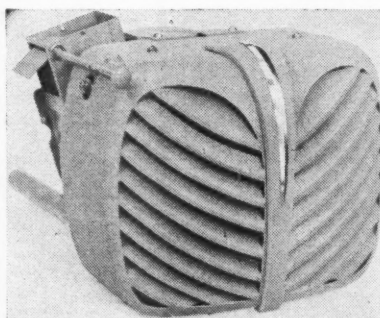
Bug Solvent

A new Bug Solvent powder, known as Mac-O-Nize, has been placed on the market by Chemical Accessories, Inc., 2376 East 71st St., Chicago, Ill. This product, when applied with a

wet cloth, is said to remove dead bugs, bug stains and road film from automobile bodies, fenders, lamps, bumpers, etc. It is claimed that the product is not abrasive, and will not scratch or mar the finish. It is supplied in a 12 oz. sifter-top can and in a 5-lb. can.

Chanson Heater

The new Chanson heater, made by the Illinois Iron & Bolt Co., Carpentersville, Ill., combines four heaters in one. Its design permits, in addition to the regular heater function, warm



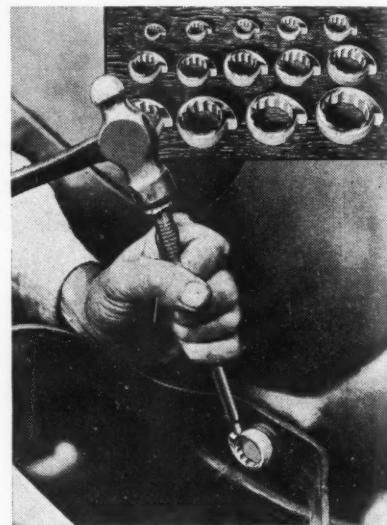
air to the floor, warm air deflected to the driver's feet, and a windshield defroster.

This new heater, known as the Universal, comes complete with special fittings and an adjustable thermostat for use on Ford and Mercury cars.

The heater is of attractive design, and commemorates the 75th anniversary of the company.

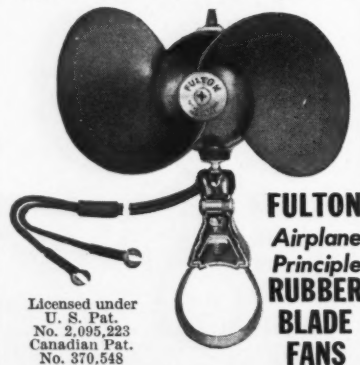
Nut Starter

The latest product of the Duro Metal Products Co., 2649 Kildare Ave., Chicago, Ill., is a set of "nut starters," consisting of a ring which fits over a nut. On the outside of the ring is a shoulder. Designed for use when a nut is frozen or is in extremely close place where it is difficult to use a wrench, the nut starter is



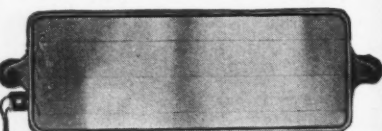
slipped over the nut and a punch and hammer used against the shoulder to loosen the nut. Also used for tightening nuts in the same manner. Nut starters are available in 1/16 in. stages from 3/8 in. to 1 1/4 in. size nuts.

for Fall Volume SELL



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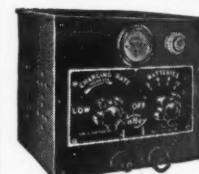


The finest warning signal made—Musical, but powerful—Instant Response, but delicate when desired.

Sound Range 1 to 10 Miles
New Remote Controlled Spot Light Ready.
Avoids drilling car body.

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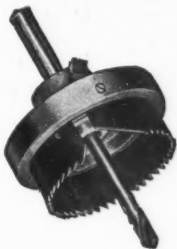
Not only all standard types of automobile, truck and tractor chains, but this year the new WESCO Double Service Chains with the new "double pretzel" links that have double gripping points (double stopping power), is double welded at wear points (double life)—that rides smoother still piles up at the slightest skid, spin or wheel lock.



Write for Catalog Sheets, and the profitable WESCO chain proposition.

WESTERN CHAIN PRODUCTS CO.
1812 Belmont Ave., Chicago, U.S.A.

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The universal installation tool for Car Heaters, Car Radios and other Car Accessories — used everywhere.

Any size from 5/8" to 15" for Metal or Wood.

Quick holes for the service station mechanic.

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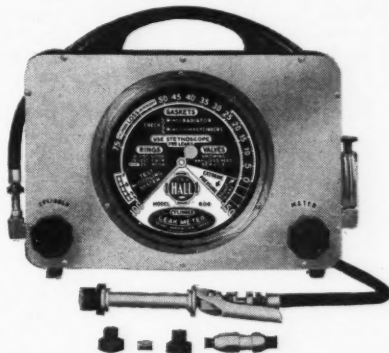
MISENER MFG. CO., INC.
Syracuse, N. Y.

Sounds Horn When Brakes Are Applied

A new device which sounds the horn when the brakes are applied has been introduced by Vanguard, Inc., 4220 W. Lake St., Chicago, Ill. The device is so designed that it operates only when an emergency brake application is made. Should failure of braking system occur, horn blows continuously while the brake pedal is depressed. In connection with the horn sounding, a red light shows on the instrument panel when braking power is reduced by brake fluid loss.

Tests Combustion Chamber for Leaks

The new Hall Cylinder Leakmeter is a device for testing the exact condition of the entire combustion chamber of a motor and to show up leaks through valves, rings, cylinder wear and gaskets. It is a product of the



Hall Mfg. Co., 1600 Woodland Ave., Toledo, Ohio. There are no electrical connections or delicate mechanism and it is said to be so simple that any motorist can understand the dial readings. It indicates the percentage of power loss from each of the possible sources.

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- ✓ CAMBER
- ✓ CASTER

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SCIENTIFIC WHEEL ALIGNING EQUIPMENT

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Write for complete information on wheel aligning equipment for cars and trucks.

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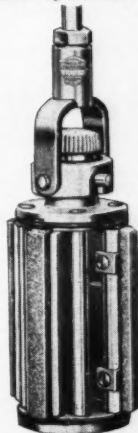
742 Gallivan Blvd. Dorchester, Mass.
In the wheel-aligning equipment business over 20 years.

DURO CYLINDER HONE & GRINDER

Self-

LUBRICATING CYLINDER GRINDERS

Cylinder grinding is simplified and made more profitable with this tool. It's the fastest and cleanest operating of all grinders. Gives the highest degree of accuracy. Two sizes cover all cars and trucks. Also grinders for hydraulic brake cylinders.

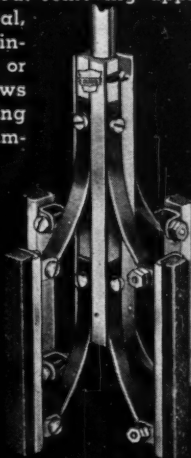


Surfaced Honed Cylinders are Best

All piston ring manufacturers recommend taking off the cylinder glaze, which this tool does without removing appre-

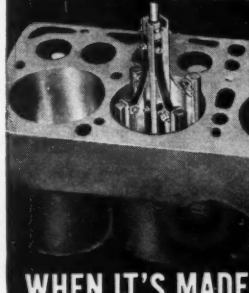
ciably any of the metal, when new rings are installed, either standard or expanding type. This allows a perfect and quick seating of the ring installation, improving compression, which means a satisfactory job.

The operation of this tool is so simple and efficient that it takes only about one minute per cylinder to properly condition them. It's automatically centered by special springs—no adjustments necessary.



DURO METAL PRODUCTS CO.

Dept. MA-2 2649 N. Kildare Avenue
CHICAGO, ILLINOIS

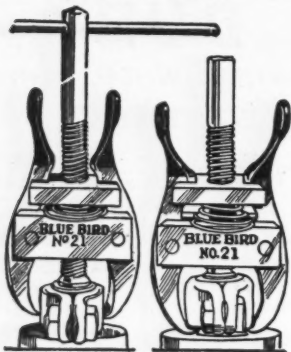


The extra fine burnishing stones resurface cylinders and do not remove metal. The felt buffing guide is saturated with kerosene to prevent flying dust. Any 1/2" electric drill handles the surfacing hone efficiently. Made in two sizes which will take care of practically any requirements. Free catalog on request.

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BATTERY SERVICEMEN

Prefer and Choose
BLUE BIRD SERVICE TOOLS
For Efficiency, Speed and
Labor Saving



NO. 21 UNIVERSAL LIFTER

Easily removes the most badly corroded Clamp of any type. It grips from below or sides of Clamp.

The Harder the pull—The Tighter the grip
Price: \$1.20 Postpaid—East of Rockies
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NO. 52 "SUPER GRIP" PLIER

A general utility Nut Wrench. Maintains its own grip after engaging Hexagon, Square or Round Parts. Just enough squeeze necessary to hold jaws in contact with work. Special design eliminates all strain on alloy steel rivet. An overabundance of power for the toughest job . . . Length 7 1/2 inch.

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Order thru your Jobber or remit direct.
"Mr. Jobber" write for catalog and distributors' Proposal.

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Straightens battered threads on all shafts of five sizes from 5/8" to 1 1/8". Easy to use, positive in performance. Order No. U-131 Axle Rethreading Die today.

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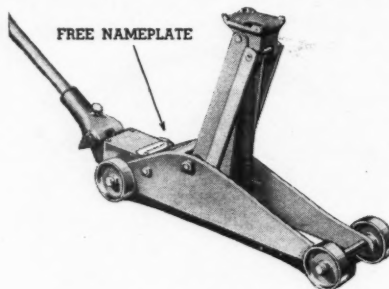
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PISTONS: ALUMINUM, CAST IRON
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SHACKLES: TRYON, SILENT "U"
KNEE ACTION PARTS

THE TOLEDO STEEL PRODUCTS COMPANY
3304 Summit Street Toledo, Ohio, U. S. A.

Blackhawk Has New Jack

The latest addition to the line of jacks made by Blackhawk Mfg. Co., 5325 West Rogers St., Milwaukee, Wis., is the new S-17 Curb Service jack. It is hydraulic, has 1 1/2-ton capacity, and is designed particularly



for service stations, tire dealers, filling stations and parking garages. Its total height is 18 1/2 in., has a removable handle for convenient handling in service cars, and extra wide wheels to prevent damage to soft driveways.



"They're just doing that to make us think we need a new hoist!"

OUTSTANDING

performance in the
Automotive Industry



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BATTERY CHARGERS

INCREASE YOUR WINTER PROFITS!

New, improved ventilation—cool, low-cost operation and longer life. 2 YR. GUARANTEE. Get Bulletin 68 on Complete Line. At right; 6-Batt. Size bulb
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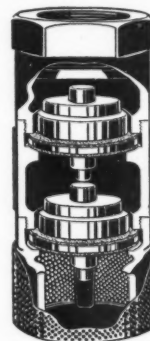


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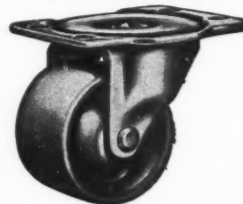
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For running-in new and rebuilt engines use auxiliary lubricants containing "dag"® Brand colloidal graphite.

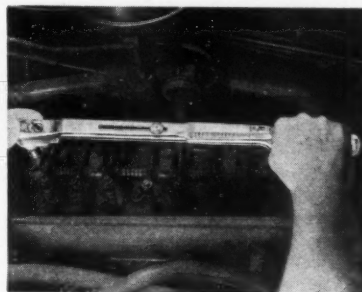
Acheson Colloids Corporation

Port Huron Michigan

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Torque Wrench

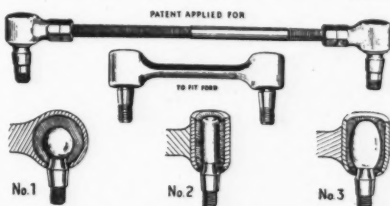
J. H. Williams & Co., 225 Lafayette St., New York City, has announced No. S-57 Torque "Measurrench" of the reversible ratchet type, for use with any detachable socket having 1/2 in. square drive. This new wrench, which indicates applied right hand torque, does not depend upon delicate gears, levers or dials, but on rugged sections of high tensile steel. The calibrated scale shows applied pressures of from



20 to 200 foot-pounds. It is equipped with a 36-tooth ratchet wheel, and is reversible by a flip of the shifter which is flush with the head. The wrench is 19 1/2 in. long. With each wrench is supplied a chart giving the foot-pounds tension to be applied on cylinder heads, connecting rods, main bearings, etc., as recommended by the car and truck manufacturers.

Hygrade Announces New Shock Link

The latest product of the Hygrade Products Co., 35-35 Thirty-fifth St., Long Island City, N. Y., is a new shock absorber link known as the Elliptic Ball-joint Link. It is said to incorporate the flexibility of the spherical ball-joint with the carrying



capacity of the clevis type. It has a wide range of replacement for passenger cars and trucks equipped with shock absorbers using ball-joint links.

Hygrade has just issued a new catalog of Shock Absorber Replacement Parts.

A FIFTEEN INCH TIP on the WEATHERHEAD FREEZEMETER



A 15 inch tip is only one of the many features that make the Weatherhead Model 136 Freezometer a favorite among servicemen. Every part of this up-to-the-minute freezometer is designed to help you give your customers faster, more reliable radiator readings.

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Your jobber can supply you. Get your order in early. Winter's just around the corner.

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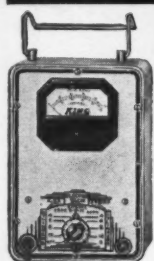
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The NEW "KING" CAM ANGLE METER



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The NEW "KING" Cam Angle Meter CA-2 is a very important piece of equipment that every shop can profitably use. This meter can be used on the car with engine running at any speed and will quickly detect trouble in the points or mechanism. It will not vary more than one degree over the full speed range if the distributing points are in good order. Voltage range will not affect the readings. It gives readings "on the nose" while other makes vary as much as four degrees. We can hold ours accurate for various ranges of voltage from 6 to 8 or higher and show the trouble is in the distributor. It is the only positive method of setting breaker points.

Make ALL Tests
on the "KING" MT-700
with ELECTRO-TACH



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EXHAUST
GAS
ANALYZER
only
\$350.00

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The "KING" MT-700 appeals to those who want one unit that will make all Motor and Ignition tests, including Exhaust Gas and R.P.M. The large 8 1/2" meter indicates Exhaust Gas and R.P.M. QUICKLY and ACCURATELY. The "KING" MT-700 is a beautiful and impressive piece of equipment that will quickly sell your customers on the idea that you are giving them modern, up-to-date service. The "KING" line is very large, with a wide price range, and you will find the equipment you need at the price you can pay.

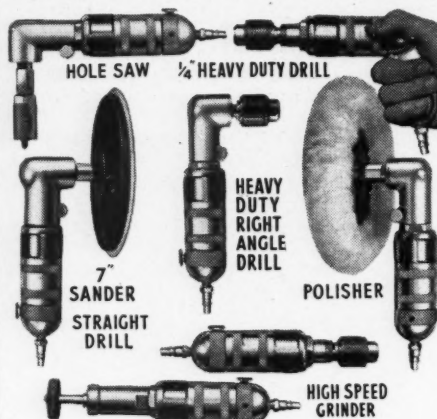
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The ELECTRIC HEAT CONTROL Co.
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KING Good Products Since 1914 **KING**

Aro Has New Tool Kit

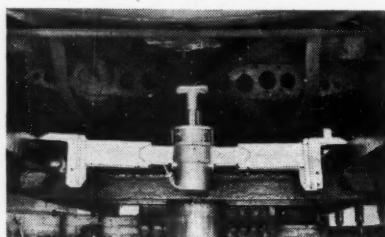
Aro Equipment Co., Bryan, Ohio, has developed a new tool kit for pneumatic operation. The introduction of this new product by the manufacturer of lubricating equipment is in response to a need for smaller, more



powerful and more versatile tools in the service field. The Aro Pneumatic Tool Kit, weighing only 14 1/2 lbs., includes a small, powerful air motor which, with simple attachments also included, may be quickly assembled to form seven complete essential tools to perform a large variety of everyday jobs in the shop. Attachments include a polisher, sander, hole saw, grinder and a drill. Other accessories are also available.

Alemite Pit Lift Air Jack

One of the latest products of The Alemite Division of Stewart-Warner Corp., 1826 Diversey Parkway, Chicago, Ill., is the pit lift air jack. Designed in four models, the new air jack (operated by compressed air) can be used on a pit, drive-on lift or



free-wheel lift, and has a capacity of 1 1/2 tons. It supports the weight of the body and engine so that the various lubrication points are relaxed so that lubricant can flow freely to all bearing surfaces.

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wall chart giving complete
Motor Tune-up data for all
Carter equipped cars.

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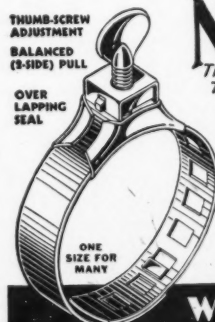
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